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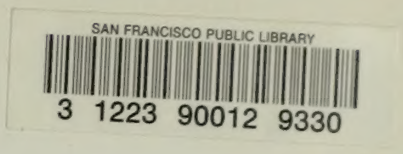

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APPENDIX TO

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THE COMPREHENSIVE San Francisco MASTER PLAN For Waste Water Management PRELIMINARY REPORT

PREPARED BY:

DEPARTMENT OF PUBLIC WORKS

APPENDIX TO

THE COMPREHENSIVE MASTER PLAN PRELIMINARY REPORT

PREPARED BY:.

DEPARTMENT OF PUBLIC WORKS

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FOREWORD

THIS APPENDIX IS A SUPPLEMENT TO THE COMPREHENSIVE MASTER PLAN. MOST OF THE DATA CONTAINED HEREIN ARE INTENDED TO SUBSTANTIATE THE GENERAL DATA DISCUSSED IN VARIOUS CHAPTERS OF THE MASTER PLAN REPORT.

THE DIFFERENT ITEMS CONTAINED IN THIS APPENDIX ARE LISTED BELOW IN THE SAME SEQUENCE AS THEY ARE DISCUSSED:

1. THE SAN FRANCISCO SEWERAGE SYSTEM AND ITS TOTAL COST
2. WASTEWATER QUALITY DATA
3. WET WEATHER WASTEWATER LOADS
4. RECEIVING WATER QUALITY PARAMETERS
5. THE EFFECTS OF STORMWATER RETENTION BASINS UPON STORM FREQUENCIES HANDLED BY A COMBINED SEWER SYSTEM
6. CATCHBASIN SURVEY
7. ESTIMATING THE FACILITIES
8. DRAINAGE AND WATERSHED CHARACTERISTICS OF THE SEWERAGE SYSTEM
9. FLOW PROJECTIONS FOR THE SEWERAGE SYSTEM
10. SEWER INADEQUACY STUDY
11. STORAGE CAPACITY VS. TREATMENT RATE ANALYSIS

NOTE THAT EACH ITEM IS TREATED SEPARATELY AND THE CORRESPONDING TABLES, FIGURES, AND/OR PLATES REFERRED TO WILL BE FOUND DIRECTLY AT THE END OF THE TEXT FOR EACH ITEM. EACH ITEM IS, THEREFORE, INTENDED TO BE INDEPENDENT.

ERRATA

The following errata is intended to correct the major errors that result in the first publication of a document of this size. The final Appendix will be revised to include these corrections along with expected additional items that become apparent as review proceeds.

Section One
The San Francisco Sewerage System and Its Total Cost

ITEM	PAGE	CORRECTION
1	2 Line 7	Change from "In 1951 to 1952," to "In 1951 and 1952."

Section Three
Wet Weather Wastewater Loads

1	5 - Table IV-20	Add footnote (1) - Federal Office Building (FOB) raingage.
2	9 - Table IV-22	Delete asterisks shown after July to Dec. 1969, Jan. to June 1970, and July 1969 to June 1970
3	12 - Table IV-23	Footnote B Delete (For storms corrected) Add (Storms Uncorrected from 24 hour concept) Footnote C add (to activity orientation).
4	15 Table IV-26	Footnote 1 - Change Table IV-20 to IV-22 Footnote 2 - Change Table IV-22 to IV-23

Section Four
Receiving Water Quality Parameters

1	1 Line 11	Replace "20×10^6" with "29×10^6"

Section Four (Cont'd.)
(Receiving Water Quality Parameters)

ITEM	PAGE	CORRECTION
2	1 Line 13	Replace "62 x 10^6" with "6.2 x 10^6"
3	3 Figure IV-31	Mean MPN/100 ml of Dry Weather Receiving Water changed from "3.5 x 10" to "3.5 x 10^2"

Section Five
The Effects of Stormwater Retention Basins upon Storm Frequencies Handled by a Combined Sewer System

1	3 line 7	"Table V-13" to "Table V-13 A"
2	3 line 16	"Table V-13A" to "Table V-13"
3	18 Table V-13 Conduit from 44810 to 44800	Change Q_{100} from "136" to "146" cfs
4	18-Table V-13 Conduit from 44800 to 44310	Change Q_{100} from "458" to "487" cfs
5	23-Table V-14 Conduit from 44810 to 44800	Change 100-year flow for alternate (3) from "136" to "146"
6	23-Table V-14 conduit from 44800 to 44310	Change 100 year flow for alternate (1) from "486" to "832" and for alternate (3) from "832" to "487"

Section Six
Catchbasin Survey

1	1	Additional paragraph: Catchbasin samples taken from the demographic areas (Figures V-35 thru V-46) are to be the basis of a Citywide extrapolation of the effects of catchbasins upon the sewerage system. A Citywide extrapolation would be similiar to that developed in the Drainage and Watershed Characteristics section of this Appendix.

Section Six (Cont'd)
(Catchbasin Survey)

ITEM	PAGE	CORRECTION
2	2	Table V-20 to be identified and referenced to figures:

Area	Figure
1a Folsom St.	V-20a
1b 4th & Bluxome	V-20a
2 Harrison & 19th	V-20b
3 Moraga & 25th	V-20c
4 Tennessee & 19th	V-20d
5 Divisadero & North Pt.	V-20e
7 Plymouth & Sadowa	V-20f

3	3	Table V-21 Demographic Area designation to be added to table:

a. Low Income Residential - Plymouth & Sadowa, Webster & Turk
b. Industrial - 7th & Hopper, Yosemite, Lower Selby
c. Single Family Residential - 40th & Moraga, Upper Mission
d. Commercial - Mason & O'Farrell, 32nd & Tarava Montgomery
e. High Income Residential - Marina Area
f. Multiple Family Residential-Haight & Ashbury

Section Seven
Estimating the Facilities

1	2 Last sentence in first paragraph of Retention Basins Section.	Delete "Manifold in rating progressing"
2	5 4th line	Insert", by a consultant," between "supplied" and "for"
3	7- Last paragraph	"invironments" changed to "environments"
4	13 Table V-71 Bottom of table	Change from "S = Profile & OH x 1.25 = $210.64 to "S = Profit & OH = Sum x 1.25 = $210.64

Section Nine
Flow Projections For The Sewerage System

ITEM	PAGE	CORRECTION
1	2	Table "3" changed to Table "4"
2	3	Change the NP effluent flow from "15.9" MGD to "51.9" MGD
3	6 - Table 4	Change in Note 3. "Table 3" to be replaced by "Figure 2"

Section Ten
Sewer Inadequacy Study

1	2	Replace r with $\sqrt{r}$ in formula for c, frictional loss coefficient.
2	3 Line 11	Change from "0.11" to "0.011"
3	6 New Paragraph under Data Collections	Insert - Plates 1 thru 4 - summarize for each of the various outfalls tabulated, the total miles of transport sewer investigated, the miles of inadequate transport-sewer and the cost of construction for the noted ranges of adequacy.
4	6c) & d)	Replace c) "high energy grade" with "upper energy grade line elevation". Replace d) "low energy grade" with "lower energy grade line elevation"
5	7 New paragraph between paragraphs 2 & 3	If a sewer were determined to be between 95% and 100% adequate, no cost of construction was calculated.

Section Eleven
Storage Capacity vs. Treat Rate Analysis

1	10 Plate 8	Treatment rate from 23182 hundredths of an inch per hour to 2 hundredths of an inch per hour.

THE SAN FRANCISCO SEWERAGE SYSTEM & ITS TOTAL COST

THE SAN FRANCISCO SEWERAGE SYSTEM AND ITS TOTAL COST

Due to tremendous public pressure and indignation over the generally deplorable state of the sanitary disposal facilities, San Francisco adopted its first sewerage master plan in 1899, as recommended by Messrs. Grunsky and Manson.[1] Among the recommendations toward future developments were the incorporation of the then existing 250 miles of combined sewers into a coherent plan of disposal using the natural watershed drainage patterns, the continuation of building combined sewers, and the recommendation that disposal of raw sewage be accomplished via deep water outfalls.

In the ensuing 35 years, the first two of these recommendations were carried out and over 700 miles of combined sewers were in use. In 1935, Messrs. Eddy, Hyde, Kennedy and Reynolds published a second master plan[2] for the collection, treatment, and disposal of San Francisco's sewage. This plan provided for the division of the City into three major areas, each to be tributary to its own treatment plant, installation of dry weather diversion fittings on the storm water system, the construction of three primary treatment plants to provide primary sewage treatment for all dry weather sanitary flows and 0.02 iph

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1) System of Sewerage for the City of San Francisco (1899) by C. E. Grunsky, et al.
2) Report on the Treatment and Disposal of the Sewage of San Francisco (May 1935), by H. P. Eddy, et al.

of rainfall, and the continued construction of combined sewers.

Immediately following the publication of the second master plan, the Richmond-Sunset Water Pollution Control Plant was constructed providing treatment for the dry weather sewage flow from the western side of the City. In 1951 to 1952, the North Point and Southeast Water Pollution Control Plants were completed providing primary treatment for most of the City's dry weather flow and a fraction of the wet weather flow. Between 1951 and 1965, a program of fitting the storm water system with facilities to intercept the remaining dry weather sewage flow was implemented which when completed, resulted in the collection of all dry weather discharges on the northern and eastern periphery of the City.

The present San Francisco sewerage system includes over 900 miles of combined sewers, 56 diversion structures, 35 miles of intercepting sewers, 22 pumping stations, and three primary treatment plants. The worth of this total system in 1971 dollars is estimated to be 1.33 billion dollars. Table IV-1 shows the breakdown of the system's estimated value.

ESTIMATED VALUE OF THE SEWERAGE SYSTEM

Millions of 1971 Dollars (1)

Conduits	8" - 36" in dia.	466
	36" - 60" in dia.	130
	60" in dia.	151
Tunnels		28.8
Culverts		32
Side Sewers		317
Catchbasins		25
Manholes		16
Pile Supports		32
Diversion Structures		12
	Sub total	1,209.8
Treatment Plants W/ Improvements and Additions		
NP		62.87
SE		20.76
RS		28.16
Pump Station		8.44
	TOTAL	$1,330

(1) ENR = 1700

E.N.R. COST INDEX

YEAR	INDEX	YEAR	INDEX
1939	240	1955	690
1940	250	1956	730
1941	270	1957	770
1942	280	1958	820
1943	290	1959	860
1944	310	1960	880
1945	320	1961	920
1946	380	1962	940
1947	440	1963	1010
1948	480	1964	1050
1949	485	1965	1140
1950	530	1966	1210
1951	550	1967	1300
1952	590	1968	1420
1953	610	1969	1500
1954	660	1970	1610
		1971	1700

ESTIMATED VALUE
North Point Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Plant Construction	11-24-48	1951	$8.7X 10^6	$11.6 X 10^6	550	39.4
Baffles in Cl. Bldg.	2-10-54	4-13-54	3,000	4,000	660	.010
Mod. Scum	9-5-56	11-20-56	5,000	7,000	730	.016
Replace Vent. Ducts	3-6-57	10-18-57	11,000	15,000	770	.033
Pre-Aeration Sed. Bldg.	3-29-57	7-2-57	2,000	3,000	770	.006
Standby Sand Pump	6-7-57	11-13-57	14,000	19,000	770	.042
Platform & Crane	5-15-57	8-16-57	2,000	3,000	770	.006
Repair Effluent Line	12-9-60	5-12-61	4,000	5,000	880	.009
N.P. Sludge Force Main	1950		370,000	493,000	530	1.58
Improve.Grease, Scum Pump Fac.	12-13-61	3-30-62	18,000	24,000	920	.044
N.P. Eff., Infl. & Outfall	1950		$1.15X 10^6	$1.53X 10^6	530	4.92
Improve Spray Water Sys.	1-23-63	7-18-63	29,000	38,000	1010	.064
Light Fixtures	2-6-63	12-18-63	5,000	7,000	1010	.012

TABLE IV-1

TABLE IV-1

ESTIMATED VALUE
North Point Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Feeder Cable Repl.	4-30-65		5,000	7,000	1140	.010
*Const. Sludge Plant	1949	1951	3.15	4.2	485	14.75
*Sludge Cond. Units	10-17-58	11-24-58	2,000	3,000	820	.006
*#3 Dryer Recon.	11-19-58	5-8-59	12,000	16,000	820	.033
*#2 Dryer Recon.	12-18-59	6-10-60	17,000	23,000	860	.046
*Sludge Filt. Sys.	11-6-68		212,000	282,000	1420	.348
*Plant Digesters	5-23-69		352,000	470,000	1500	.531
*Dig. Group 1	5-26-61	1-12-62	108,000	144,000	920	.267
*Sludge Storage Hopper	5-26-61	5-11-62	33,000	44,000	920	.081
*Sludge Dewater Sys.	12-20-63	12-4-64	33,000	44,000	1010	.074
*Sludge Dig. Fac. & Tank #7	3-6-64	6-30-65	39,000	52,000	1050	.084
*Alter Sludge & Scum Handling	6-24-64	6-30-65	233,000	310,000	1050	.502

* 33% S.E., 67% N.P.

Total Value $62.874 X 10^6

ESTIMATED VALUE
Southeast Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Const. Sludge Plant (33%)	1949	1951	$1.55X 10^6	$2.06X 10^6	485	7.2
S.E. Sewage Plant	1950	1951	2.12X 10^6	2.82X 10^6	530	9.02
Install. Ferric Chloride Pumping Sys.	11-4-53	5-27-54	6,000	8,000	610	.022
Recon. Arch Furnace	2-17-54	3-22-54	3,000	4,000	660	.010
Arch & Rings Bar	12-3-54	2-28-55	6,000	8,000	660	.021
Eductor Pump Hoist	12-15-54	7-15-55	36,000	48,000	660	.129
Recon. Mech. Screen	7-9-54	10-5-54	4,000	5,000	660	.013
New Boiler	8-18-54	6-3-55	114,000	152,000	660	.393
Install. Mud & Eductor Pump Piping	7-29-55	12-7-55	3,000	4,000	690	.010
Stairs & Handrails	2-10-56	9-21-56	17,000	23,000	730	.054
Paving & Sprinkling	8-15-56	2-19-57	54,000	72,000	730	.168
Heat & Vent.	9-18-57	1-17-58	2,000	3,000	770	.007
Paint Water Tank	5-22-57	6-28-51	5,000	7,000	770	.015

TABLE IV-1

ESTIMATED VALUE
Southeast Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Scum Sep., Conveyor	3-19-58	10-30-58	8,000	10,000	820	.021
Hand Rail	1-31-58	3-21-58	8,000	10,000	820	.021
Reconst. Grit Washer	8-6-58	11-7-58	3,000	4,000	820	.008
*Sludge Condition Units	10-17-58	11-24-58	1,000	1,000	820	.002
*#3 Dryer Reconst.	11-19-58	5-8-59	6,000	8,000	820	.017
*#2 Dryer Reconst.	12-18-59	6-10-60	8,000	11,000	860	.022
Recon. Pumps & Sumps	10-2-68	12%	270,000	360,000	1420	.433
*Sludge Filtration System	11-6-68	39%	106,000	141,000	1420	.169
Pressure Trans. Conduit	11-13-68		7,000	9,000	1420	.011
*Plant Digesters	5-23-69		176,000	234,000	1500	.265
*Digester Group 1 (Revis. Piping)	5-26-61	1-12-62	54,000	72,000	940	.130
*Sludge Stor. Hopper	5-26-61	5-11-62	17,000	23,000	920	.042

TABLE IV-1

ESTIMATED VALUE
Southeast Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
22" Waste Return Piping Improv.	2-14-62	7-31-62	14,000	19,000	940	.034
*Sludge Dewater Sys.	12-20-63	12-4-64	16,000	21,000	1010	.035
*Sludge Dig. Fac. & Tank #7	3-6-64	6-30-65	19,000	26,000	1050	.042
Reconst. Grit Screening	3-20-64	5-26-64	296,000	394,000	1050	.640
Repair & Paint Water Tank	6-12-64	11-24-64	9,000	12,000	1050	.019
*Alter Sludge & Scum Handling	6-24-64	6-30-65	116,000	154,000	1050	.250
Waste Return Piping	5-3-67	1-7-68	55,000	73,000	1300	.095
Auto. Samplers	5-26-67	2-16-68	21,000	28,000	920	.052
Outfall Ext., Booster Pump Sta.	10-11-67		797,000	1,060,000	1300	1.39

Total 20.76 X 10^6

* 33% S.E., 67% N.P.

ESTIMATED VALUE
Richmond Sunset Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Plant Construction		1939	$2 X 10^6	$2.66 X 10^6	240	18.9
Add. to Grit Grease Tank	6-15-45	2-15-47	9,000	12,000	320	.063
Sluice Gate Infl. Chan.	11-19-52	3-11-53	1,000	1,000	590	.003
Enlarg. of Plant	6-26-46	5-9-49	862,000	1,150,000	380	5.13
Alter. Digester Piping	4-1-53	5-10-53	2,000	3,000	610	.008
Clean Digester Dome	4-27-55	6-30-55	1,000	1,000	690	.002
Install Boiler	5-18-55	1-3-56	27,000	36,000	690	.088
Add. Cover Plates	8-20-54	10-4-54	2,000	3,000	660	.088
Piping & Misc. Work	1-4-56	5-9-56	8,000	11,000	730	.026
Sludge Pump & Gas Compressor	3-14-56	2-8-57	14,000	19,000	730	.044
Add. Channel Gates	5-31-56	11-25-56	11,000	15,000	730	.035
Window Replace	5-8-57	8-2-57	6,000	8,000	770	.018
Alter. Sand Washer	8-7-57	11-14-57	2,000	3,000	770	.007

TABLE IV-1

ESTIMATED VALUE
Richmond Sunset Water Pollution Control Plant

Project	Date Awarded	Date Compl.	Cont. Cost	Est. Proj. Cost	ENR Cost Index	1971 Dollars X 10^6 (ENR 1700)
Alter. Sand Washer	11-15-57	2-20-58	5,000	7,000	770	.015
Add. Office Room	1-5-58	7-31-58	32,000	43,000	820	.088
Replace Sludge Central House	3-9-60		5,000	7,000	880	.014
Reconst. Headworks	2-19-69	7%	736,000	980,000	1500	1.105
Reconst. Elect Fac.	2-7-69	95%	11,000	15,000	1500	.017
Sludge Digester Alter.	8-9-63	1-22-65	109,000	145,000	1010	.244
Water Supply Mod.	12-27-63	10-13-64	45,000	60,000	1010	.101
Sunset Pump. Sta. Mod.	4-8-64	6-30-65	243,000	323,000	1050	.524
Modify Sed., Cl, & Sewage Fac.	4-9-65	10-3-66	764,000	1,030,000	1140	1.685
Standby Gas Compress.	4-20-66	2-17-67	20,000	27,000	1210	.038

Total 28.163 X 10^6

TABLE IV-1

TABLE IV-1

Pump Station		Capacity MGD	Repl. $ Value
1.	Lake Merced	6.77	$.275 \times 10^6$
2.	Park Merced	Not in Service	
3.	Vicente	1.29	.100
4.	Pine Lake	0.20	.035
5.	Fulton	1.16	.094
6.	Sea Cliff # 1	0.78	.084
7.	Sea Cliff # 2	0.90	.078
8.	Richmond Sunset TP	33	.800
9.	Marina	16.15	.580
10.	Hyde	0.65	.068
11.	Drumm	12.36	.400
12.	4th St. No. Ch.	16.75	.580
13.	4th St. So. Ch.		
14.	Palace of Fine Arts	.325	.042
15.	North Point T.P.	190	2.100
16.	Mariposa	1.55	.113
17.	20th St.	0.78	.070
18.	Tennessee St.	2.16	.100
19.	Hunters Pt.	1.74	.120
20.	Yosemite	12.27	.400
21.	South East T.P.	70	1.200
22.	S.E. Booster P.S.	70	1.200
		TOTAL	8.439×10^6

PROPORTION OF SLUDGE FACILITIES
RE: NORTH POINT AND SOUTH EAST

AVE D.W. FLOW S.E. = 30 MGD 33%

N.P. = 65 MGD 67%

($Mill)

Item	Contract Cost	Year	33% S.E.	67% N.P.
N.P. Sludge Plant	$4.7 Mill	1951	1.55	3.15
N.P. Treat Plant	$8.7	1951	----	3.7
S.E. Treat Plant	$2.12	1951	2.12	----
N.P. Cross Town Sludge Force Main	$ .37	1950	----	.37
N.P. Eff./Infl./Outfall	$1.15	1950	----	1.15

WASTEWATER

QUALITY DATA

WASTEWATER QUALITY DATA

In conjunction with wastewater quality discussed in Chapter IV of the Comprehensive Master Plan report, monthly average concentrations taken from July 1969 to June 1970 are shown in Tables IV-7, IV-8, and IV-9 for NPWPCP, RSWPCP, and SEWPCP respectively. The concentrations reported on these tables are for suspended solids, BOD, and grease, with corresponding percentage removals and flow for the 18 months period.

Utilizing the average monthly concentration and flow data, the pollutants are then tabulated in terms of average pounds per day as shown in Tables IV-10, IV-11, and IV-12 for NPWPCP, RSWPCP, and SEWPCP respectively.

RAW DATA REPORTED BY NORTH POINT WPC PLANT

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS			B.O.D.(5)			GREASE		
	Influent (MGD)	Effluent (MGD)	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed
July 69	61.7	60.4	162	74	54	242	171	29	56.9	32.3	43
Aug. "	61.5	59.7	221	81	63	232	158	32	61.9	39.9	36
Sept."	61.3	60.0	160	86	46	232	174	25	53.3	35.7	33
Oct. "	64.6	62.9	187	87	54	235	160	32	60.9	36.3	40
Nov. "	61.2	59.7	175	81	54	198	154	22	45.1	31.8	30
Dec. "	72.6	71.5	147	85	42	178	141	21	38.7	30.7	21
Jan. 70	81.4	79.6	114	70	39	159	124	22	34.4	21.4	38
Feb. "	66.5	65.2	126	76	40	185	158	15	40.6	31.7	22
Mar. "	63.7	62.2	135	74	45	195	166	15	41.3	31.8	23
Apr. "	59.1	58.2	154	68	56	230	188	18	50.2	33.1	34
May "	57.8	55.9	187	72	61	257	157	39	59.5	28.1	53
June "	60.8	59.4	136	75	45	235	163	31	46.0	27.1	41
July "	59.8	58.3	163	69	58	236	149	37	56.0	26.5	53
Aug. " (1)	59.8	58.4	165	73	56	259	162	37	54.8	27.7	49
Sept."	58.5	57.0	209	66	68	300	175	42	67.7	25.8	62
Oct. "	63.9	62.5	216	60	72	248	138	44	62.1	27.0	57
Nov. "	73.6	72.3	201	70	65	230	138	40	57.9	29.7	49
Dec. "	76.5	75.2	175	63	56	210	133	37	70.0	35.2	50
AVE.	64.7	63.3	169	73.9	58	226	156	31	53.2	30.7	42
Min.(2)	57.8	55.9	114	60	39	159	124	15	34.4	21.4	21
MAX(2)	81.4	79.6	221	87	72	300	188	44	70.0	39.9	62

(1) Calculated by the addition of 1.4 MGD to the effluent flow.

(2) Minimum and maximum figures are the average monthly concentrations.

TABLE IV-8

RAW DATA REPORTED BY
RICHMOND-SUNSET WPCP

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS			B.O.D.(5)			GREASE		
	Influent (MGD)	Effluent (MGD)	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed
July 69	(1)	19.5	191	65	66	200	146	27	48	39	19
Aug. "		19.8	183	60	67	193	140	27	46	38	17
Sept."		20.1	172	61	65	183	137	25	46	36	22
Oct. "		16.7	166	58	65	187	134	28	52	38	27
Nov. "		15.7	157	52	67	194	134	31	46	35	24
Dec. "		17.4	129	55	57	179	132	26	38	33	13
Jan. 70		20.0	111	54	51	161	117	27	40	35	13
Feb. "		19.5	132	52	61	187	133	29	49	36	27
Mar. "		19.5	139	56	60	189	138	23	41	35	15
Apr. "		19.3	160	62	61	195	135	31	45	37	18
May "		19.5	157	55	65	188	140	25	47	38	19
June "		19.8	164	51	69	186	141	24	45	37	18
July "		20.1	154	52	66	179	137	23	47	40	15
Aug. "		20.0	165	60	64	179	136	24	47	38	19
Sept."		20.6	168	60	64	186	135	23	48	38	21
Oct. "		20.9	156	57	63	201	142	29	45	36	20
Nov. "		21.3	153	58	62	187	127	32	41	34	17
Dec. "		24.7	112	57	49	142	109	23	36	29	19
AVE.	(1)	19.7	154	57	63	184	134	27	44.8	36.2	19
Min.(2)		15.7	111	51	49	142	109	23	36	29	13
MAX(2)		24.7	191	65	69	201	146	32	52	40	27

(1) From Brown & Caldwell study of the RSWPCP; the influent flow averaged 0.4 MGD greater than the effluent, during dry weather.

(2) Minimum and maximum figures are the average monthly concentrations.

RAW DATA REPORTED BY
SOUTHEAST WPC PLANT

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS			B.O.D.(5)			GREASE		
	Influent (MGD)	Effluent (MGD)	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed	Influent (mg/l)	Effluent (mg/l)	% Removed
July 69	(1)	18.8	486	281	42	278	179	36	161	74	54
Aug. "		18.4	390	190	51	259	184	29	109	68	38
Sept."		18.5	373	255	32	265	193	27	104	77	26
Oct. "		18.8	398	228	43	217	176	19	98	68	31
Nov. "		18.2	587	260	56	284	144	49	145	69	52
Dec. "		20.2	430	212	51	237	124	48	122	56	54
Jan. 70		18.3	304	149	51	221	99	55	116	50	57
Feb. "		21.9	331	283	15	246	132	46	129	76	41
Mar. "		19.1	320	222	31	245	152	38	138	86	39
Apr. "		18.6	300	173	42	244	160	34	126	65	48
May "		18.3	300	174	42	248	132	47	115	53	54
June "		20.3	286	168	41	194	126	35	104	54	48
July "		21.1	318	171	46	233	154	34	110	54	51
Aug. "		20.3	314	162	48	238	186	22	116	55	52
Sept."		21.6	353	236	33	387	240	38	130	76	42
Oct. "		21.8	369	261	29	250	215	14	123	74	40
Nov. "		22.5	276	210	24	200	178	11	88	58	34
Dec. "		24.3	235	188	20	150	134	11	64	49	23
AVE.	(1)	20.1	370	212	43	244	162	34	117	65	44
Min.(2)		18.2	235	149	15	150	99	11	64	49	23
MAX(2)		24.3	587	283	56	387	240	55	161	86	57

(1) From Brown & Caldwell of the Southeast WPCP Study the influent flow averaged 0.9 MGD less than the effluent flow, during dry weather

(2) Minimum and maximum figures are the average monthly concentration

AVERAGE DAILY RAW DATA REPORTED BY NORTH POINT WPC PLANT ($lbs \times 10^3$/day)

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS		B.O.D.		GREASE	
	Influent (MGD)	Effluent (MGD)	Influent $\left(\frac{lbs \times 10^3}{day}\right)$	Effluent $\left(\frac{lbs \times 10^3}{day}\right)$	Influent $\left(\frac{lbs \times 10^3}{day}\right)$	Effluent $\left(\frac{lbs \times 10^3}{day}\right)$	Influent $\left(\frac{lbs \times 10^3}{day}\right)$	Effluent $\left(\frac{lbs \times 10^3}{day}\right)$
July 69	61.7	60.4	83.4	37.3	124	86.3	29.2	16.3
Aug. "	61.5	59.7	103.0	40.4	119	78.7	31.8	19.9
Sept. "	61.3	60.0	81.7	43.0	118	87.0	27.2	17.9
Oct. "	64.6	62.9	102	45.6	127	84.0	32.8	19.0
Nov. "	61.2	59.7	89.4	40.4	101	75.7	23.0	15.8
Dec. "	72.6	71.5	89.0	50.6	108	84.0	23.4	18.3
Jan. 70	81.4	79.6	77.4	46.4	108	81.0	23.3	14.2
Feb. "	66.5	65.2	75.4	41.3	102	85.9	22.5	17.2
Mar. "	63.7	62.2	71.7	38.4	104	86.1	21.9	16.5
Apr. "	59.1	58.2	75.9	33.0	113	91.2	24.7	16.1
May "	57.8	55.9	90.1	33.6	124	73.2	28.7	13.1
June "	60.8	59.4	68.9	37.1	119	80.7	23.3	13.4
July "	59.8	58.3	81.2	33.6	118	72.5	27.9	12.9
Aug. "	59.8 (1)	58.4	82.2	35.6	129	78.9	27.3	13.5
Sept."	58.5	57.0	102	31.4	146	83.2	33.0	12.3
Oct. "	63.9	62.5	115	31.2	132	71.7	33.1	14.1
Nov. "	73.6	72.3	123	42.2	141	83.2	35.5	17.9
Dec. "	76.5	75.2	112	39.5	134	83.5	44.6	22.1
AVE.	64.7	63.3	91.1	39.0	122	82.4	28.7	16.2

(1) CALCULATED BY ADING 1.4 MGD TO THE EFFLUENT.

TABLE IV-11

RAW DATA REPORTED BY

RICHMOND-SUNSET WPC PLANT (lbsx10^3/day)

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS		B.O.D.		GREASE	
	Influent (MGD)	Effluent (MGD)	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$
July 69	(1)	19.5	31.5	10.5	33.0	23.6	7.9	6.3
Aug. "		19.8	30.8	9.9	32.4	23.1	7.7	6.3
Sept. "		20.1	29.4	10.3	31.3	23.0	7.9	6.0
Oct. "		16.7	23.6	8.1	26.6	18.6	7.3	5.3
Nov. "		15.7	21.0	6.8	26.0	17.6	6.2	4.6
Dec. "		17.4	19.1	8.0	26.5	19.1	5.6	4.8
Jan. 70		20.0	18.9	9.0	27.4	19.7	6.8	5.8
Feb. "		19.5	21.8	8.4	30.8	21.6	8.1	5.8
Mar. "		19.5	23.0	9.1	31.2	22.4	6.8	5.7
Apr. "		19.3	26.2	10.0	32.0	21.8	7.4	6.0
May "		19.5	25.9	8.9	31.0	22.7	7.8	6.2
June "		19.8	27.6	8.4	31.2	23.2	7.6	6.1
July "		20.1	26.3	8.7	30.6	23.0	8.0	6.7
Aug. "		20.0	28.0	10.0	30.4	22.7	8.0	6.3
Sept."		20.6	29.4	10.3	32.6	23.2	8.4	6.5
Oct. "		20.9	27.6	9.9	33.6	24.7	8.0	6.3
Nov. "		21.3	27.8	10.3	33.8	22.6	7.4	6.1
Dec. "		24.7	23.4	11.7	29.7	22.4	7.5	6.9
AVE.	(1)	19.7	25.8	9.4	30.7	22.0	7.5	5.9

(1) FROM BROWN & CALDWELL INFLUENT AVERAGED 0.4 MGD GREATER THAN THE EFFLUENT DURING DRU WEATHER

TABLE IV-12

AVERAGE DAILY RAW DATA REPORTED BY

SOUTHEAST WPC PLANT (lbsx10^3/day)

MONTH	AVERAGE MONTHLY FLOW		SUSPENDED SOLIDS		B.O.D.		GREASE	
	Influent (MGD)	Effluent (MGD)	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Influent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$	Effluent $\left(\frac{\text{lbs} \times 10^3}{\text{day}}\right)$
July 69	(1)	18.8	72.4	44.1	41.4	28.1	24.0	11.6
Aug. "		18.4	56.5	29.1	37.6	28.2	15.8	10.4
Sept. "		18.5	54.5	39.3	38.7	29.8	15.2	11.9
Oct. "		18.8	59.4	35.2	32.3	27.6	14.6	10.7
Nov. "		18.2	84.5	39.5	40.9	21.9	20.9	10.5
Dec. "		20.2	68.8	35.6	37.9	20.8	19.5	9.4
Jan. 70		18.3	43.8	22.6	31.8	15.1	16.7	7.6
Feb. "		21.9	57.9	51.8	43.0	24.2	22.6	13.9
Mar. "		19.1	48.3	35.3	37.0	25.2	20.8	13.7
Apr. "		18.6	44.1	26.8	35.9	24.8	18.5	10.1
May "		18.3	43.5	26.6	36.0	20.2	16.7	8.1
June "		20.3	46.0	28.4	31.2	21.3	16.7	9.1
July "		21.1	53.4	30.1	39.2	27.1	18.5	9.5
Aug. "		20.3	50.5	27.4	38.3	31.4	18.7	9.5
Sept."		21.6	60.6	42.5	65.5	43.2	24.1	13.7
Oct. "		21.8	64.2	47.6	43.5	39.1	21.4	13.5
Nov. "		22.5	49.4	39.2	35.8	33.2	15.8	10.8
Dec. "		24.3	45.6	38.0	29.1	27.0	12.4	9.9
AVE.	(1)	20.1	58.9	35.4	38.8	27.1	18.6	10.8

(1) FROM BROWN & CALDWELL REPORT THE INFLUENT IS 0.9 MGD LESS THAN THE EFFLUENT DURING DRY WEATHER

WET WEATHER

WASTEWATER LOADS

WET WEATHER WASTEWATER LOADS

With reference to mass emission data presented in the Comprehensive Master Plan report, the pollutant emissions for the "due to storm" flows were developed using the following equations, illustrated graphically in Figure IV-22:

a) $Y_{COD} = \frac{12}{0.01 + i}$

b) $Y_{TSS} = \frac{24}{0.001 + i}$

c) $Y_{TN} = \frac{0.60}{0.01 + i}$

d) $Y_{OPP} = \frac{0.10}{0.01 + i}$

e) $Y_{HEM} = \frac{2.10}{0.10 + i}$

f) $Y_{FM} = \frac{0.24}{0.01 + i}$

Where: Y = mass emission coefficient (lbs/acre)
i = mean run-off due to storm (inches)

In the development of the mass emission data, the time period in consideration was from July 1969 to June 1970. Table IV-20 shows the 1969-70 rainfall year while Table IV-21 shows the average year based upon 30-years of record. Values obtained using the above mass emission equations as applied to the volume of rainfall that occurs during any one day is tabulated in Table IV-22.

Realizing that the start and end point of a storm are difficult to define, the 24-hr. rationale can be utilized to

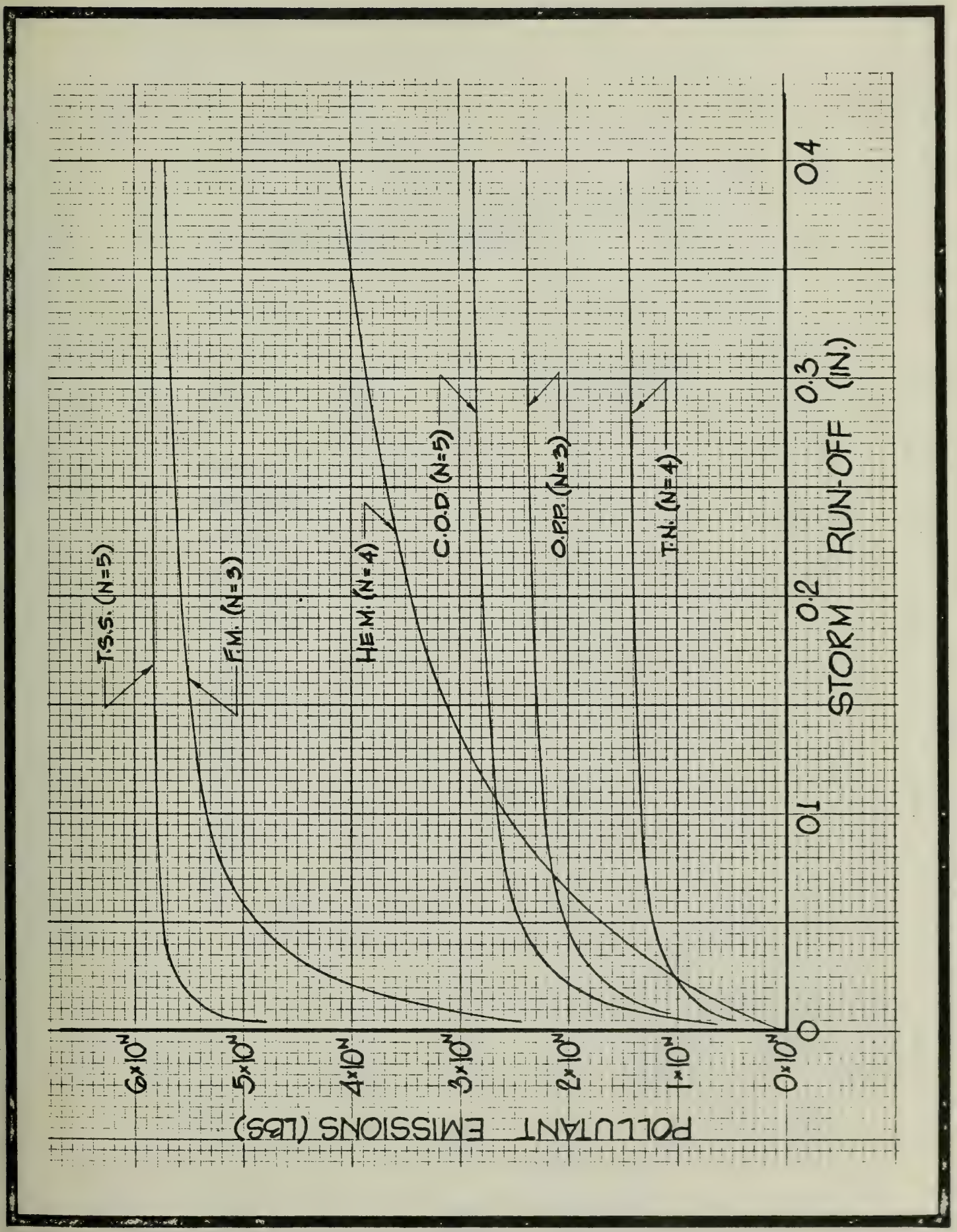
approximate a year's mass emissions. Values were developed and tabulated in Table IV-23 in an attempt to eliminate some of the very obvious incongruities of the 24-hr. limit. While these values are arbitrary and should be subject to further study and revision, they are considered adequate for purposes of approximation of the year's mass emissions.

Another set of mass emission figures was developed using a computer analysis of the last 62 years of rainfall records from the F.O.B. raingage. This approach assumed that overflows occurred for rainfall greater than 0.02 iph and the events were summarized in that fashion. There was an average of 82 events per year with a duration of 2.5 hrs. and an equivalent rainfall of 0.17 inch. Table IV-24 shows the results obtained in this manner. Since this data represents the fraction overflowing (e.g. the amount exceeding 0.02 iph rate), it is equivalent to 68% of that amount shown on Tables IV-23 and IV-24. This is based upon the historical incidence of rainfall rates shown in Table IV-25.

The range of comparative annual "due to storm" emissions calculated by using the different methods above is shown in Table IV=26.

The data presented in Table IV-22 by the second method is most consistant with the method which the emission coefficients were derived. Therefore, it will be used as the basis for comparison of dry weather emissions to wet weather emissions. The following ratios of COD: BOD were used to scale the dry weather BOD values to equivalent COD values: NPWPCP, 2.5: 1; SEWPCP, 2.9: 1; RSWPCP, 2.8: 1.

FIGURE IV-22


POLLUTANT EMISSIONS (LBS)
6×10^N
5×10^N
4×10^N
3×10^N
2×10^N
1×10^N
0×10^N
0
0.1
0.2
0.3
0.4
STORM RUN-OFF (IN.)
T.S.S. (N=5)
F.M. (N=3)
H.E.M. (N=4)
C.O.D (N=5)
O.P.P. (N=3)
T.N. (N=4)

MONTHLY RAINFALL[1] SUMMARY
(July 1969 - June 1970)

Month	Year	Precipitation (Inches)
July	1969	.0
August	"	.0
September	"	.01
October	"	2.61
November	"	0.45
December	"	6.15
January	1970	7.81
February	"	1.56
March	"	1.56
April	"	.06
May	"	.03
June	"	0.57
July 1969 to June 1970		20.81

TABLE IV-21

MONTHLY RAINFALL AVERAGES

1931 - 1970

REFERENCE: U.S. WEATHER BUREAU

MONTH	PRECIPITATION IN INCHES		
	AVERAGE	MINIMUM	MAXIMUM
JULY	0.01	0	0.06
AUGUST	0.03	0	0.49
SEPTEMBER	0.27	0	2.06
OCTOBER	0.96	0	5.51
NOVEMBER	2.40	0	6.44
DECEMBER	4.31	0.82	11.47
JANUARY	4.89	1.00	10.69
FEBRUARY	3.58	0.04	10.06
MARCH	3.00	0.07	7.05
APRIL	1.53	0	5.47
MAY	0.64	0	3.19
JUNE	0.16	0	1.42

MASS EMISSIONS DUE TO STORM
JULY 1969 TO JUNE 1970

DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
		COD	TSS	TN	OPP	HEM	FM
SEPT. 6	0.007	121	512	6.02	1.01	3.35	2.41
OCT. 8	0.045	240	572	12.00	2.00	16.00	4.79
10	0.085	262	579	13.10	2.18	23.50	5.24
14	0.045	240	572	12.00	2.00	16.00	4.79
15	1.490	291	585	14.60	2.42	48.00	5.82
16	0.033	225	568	11.20	1.88	12.70	4.49
NOV. 5	0.270	282	583	14.10	2.35	37.40	5.65
6	0.020	195	558	9.76	1.63	8.54	3.90
7	0.007	121	512	6.02	1.01	3.35	2.41
DEC. 8	0.360	285	584	14.20	2.37	40.10	5.70
9	0.007	121	512	6.02	1.01	3.35	2.41
10	0.455	287	584	14.30	2.39	42.00	5.73
11	0.065	254	577	12.70	2.11	20.20	5.08
12	0.052	246	575	12.30	2.04	17.50	4.91
13	0.007	121	512	6.02	1.01	3.35	2.41
18	0.150	275	582	13.70	2.29	30.70	5.49
19	0.351	285	584	14.20	2.37	39.90	5.69
20	1.619	291	585	14.50	2.41	48.20	5.80
21	0.429	286	584	14.40	2.39	41.60	5.73
23	0.065	254	577	12.70	2.11	20.20	5.08
24	0.299	283	584	14.20	2.37	38.40	5.67
25	0.137	273	581	13.60	2.27	29.60	5.45
JAN. 7	0.020	195	558	9.76	1.63	8.55	3.90
8	0.117	270	579	13.50	2.25	27.70	5.40
9	0.371	285	584	14.20	2.37	40.40	5.70

MASS EMISSIONS DUE TO STORM
JULY 1969 TO JUNE 1970

DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
		COD	TSS	TN	OPP	HEM	FM
JAN. 10	0.091	264	578	13.20	2.20	24.40	5.28
11	0.260	282	583	14.10	2.35	37.00	5.64
12	0.026	212	564	10.60	1.75	10.60	4.23
13	0.150	275	582	13.70	2.28	30.70	5.49
14	0.774	289	585	14.40	2.42	45.30	5.78
15	0.530	287	584	14.30	2.39	43.10	5.75
16	0.410	286	584	14.30	2.38	40.40	5.70
17	0.026	212	564	10.60	1.75	10.60	4.23
19	0.072	257	578	12.90	2.14	21.40	5.15
20	0.920	290	585	14.60	2.43	46.20	5.79
21	0.590	288	585	14.40	2.40	43.80	5.76
22	0.013	166	544	8.27	1.38	5.89	3.31
23	0.320	284	584	14.20	2.37	39.00	5.70
26	0.052	246	575	12.30	2.04	17.50	4.91
27	0.032	284	584	14.20	2.37	39.00	5.70
29	0.007	121	512	6.02	1.01	3.35	2.41
30	0.013	166	544	8.27	1.38	5.89	3.31
31	0.013	166	544	8.27	1.38	5.89	3.31
FEB. 1	0.007	121	512	6.02	1.01	3.35	2.41
9	0.026	212	564	10.60	1.75	10.60	4.23
12	0.130	272	581	13.60	2.27	29.00	5.44
13	0.065	254	577	12.70	2.12	20.20	5.08
16	0.384	285	584	14.30	2.38	40.70	5.71
17	0.013	165	544	8.27	1.38	5.89	3.31
27	0.104	267	580	13.40	2.23	26.10	5.34

MASS EMISSIONS DUE TO STORM
JULY 1969 TO JUNE 1970

DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
		COD	TSS	TN	OPP	HEM	FM
FEB. 28	0.286	283	584	14.20	2.36	38.00	5.66
MAR. 1	0.143	274	582	13.70	2.28	30.10	5.47
3	0.026	211	564	10.60	1.76	10.60	4.23
4	0.761	289	545	14.40	2.41	45.10	5.78
7	0.026	211	564	10.60	1.76	10.60	4.23
9	0.039	233	571	11.70	1.94	14.40	4.66
14	0.013	165	544	8.27	1.38	5.89	3.31
APR. 13	0.007	121	512	6.03	1.01	3.35	2.41
19	0.020	195	558	9.76	1.63	8.54	3.90
26	0.013	165	544	8.27	1.38	5.89	3.31
MAY 13	0.020	195	558	9.76	1.63	8.54	3.90
JUNE 8	0.312	284	584	14.20	2.37	38.80	5.68
9	0.059	250	576	12.50	2.09	19.00	5.01
SUB-TOTAL FROM JULY TO DEC. 1969:*							
(22 STORMS)	6.000	5234	12462	262	43.6	544	105
SUB-TOTAL FROM JAN. TO JUNE 1970:*							
(41 STORMS)	7.550	9574	22944	478	79.4	921	191
GRAND TOTAL FROM JULY 1969 TO JUNE 1970:*							
(63 STORMS)	13.550	14808	35406	740	123	1465	296

ACTIVITY ORIENTED CORRECTIONS TO TABLE IV-22

STORMS	DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
			COD	TSS	TN	OPP	HEM	FM
1	OCT. 14	0.007	121	512	6.03	1.00	3.35	2.41
1	OCT. 15	1.528	291	585	14.50	2.42	48.10	5.82
2	NOV. 5	0.260	282	583	14.10	2.35	37.00	5.64
2	NOV. 6	0.026	211	564	10.60	1.76	10.60	4.23
3	DEC. 10	0.384	285	584	14.30	2.38	40.70	5.71
3	DEC. 11	0.098	266	580	13.30	2.21	25.40	5.31
3	DEC. 12	0.091	264	579	13.20	2.20	24.40	5.28
4	DEC. 18	0.033	225	568	11.20	1.87	12.70	4.49
4	DEC. 19	0.455	287	584	14.30	2.39	42.00	5.73
4	DEC. 20	1.632	291	585	14.60	2.43	48.30	5.82
5	DEC. 23	0.026	211	564	10.60	1.76	10.60	4.23
5	DEC. 24	0.338	284	584	14.20	2.37	39.50	5.69
6	JAN. 8	0.111	269	580	13.40	2.24	27.00	5.37
6	JAN. 10	0.098	266	580	13.30	2.21	25.40	5.31
7	JAN. 13	0	0	0	0	0	0	0
7	JAN. 14	0.923	290	585	14.50	2.41	46.20	5.79
8	JAN. 15	0	0	0	0	0	0	0
8	JAN. 16	0.936	290	585	14.50	2.41	46.30	5.79
9	JAN. 20	0	0	0	0	0	0	0
9	JAN. 21	1.502	291	585	14.50	2.42	48.00	5.82
10	JAN. 31	0.020	195	558	9.76	1.63	8.50	3.90
10	FEB. 1	0	0	0	0	0	0	0
11	FEB. 28	0.280	283	584	14.10	2.36	37.80	5.65
11	MAR. 1	0.150	275	582	13.70	2.29	30.70	5.49
12	JUNE 8	0.371	285	584	14.30	2.38	40.40	5.70

ACTIVITY ORIENTED CORRECTIONS TO TABLE IV-22

STORM	DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
			COD	TSS	TN	OPP	HBM	FM
12	JUNE 9	0	0	0	0	0	0	0
	SUB-TOTAL CORRECTIONS		JULY TO DEC. 1969					
	(12 STORMS)	4.878	3018	6872	151	25.1	343	60
	SUB-TOTAL CORRECTIONS		JAN. TO JUNE 1970					
	(9 STORMS)	4.391	2444	5223	122	20.4	310	49
	GRAND TOTAL CORRECTIONS JULY 1969 TO JUNE 1970							
	(21 STORMS)	9.269	5462	12095	273	45.5	653	109

NOTES:

(1) 0.06 INCH PRECIPITATION OF OCT. 14 TRANSFERRED TO OCT. 15 STORM.
(2) 0.01 " " " NOV. 5 " " NOV. 6 "
(3) 0.11 " " " DEC. 10 " " DEC. 11 "
(3) 0.06 " " " DEC. 11 " " DEC. 12 "
(4) 0.18 " " " DEC. 18 " " DEC. 19 "
(4) 0.02 " " " DEC. 19 " " DEC. 20 "
(5) 0.06 " " " DEC. 23 " " DEC. 24 "
(6) 0.01 " " " JAN. 8 " " JAN. 9 "
(6) 0.01 " " " JAN. 9 " " JAN. 10 "
(7) 0.23 " " " JAN. 13 " " JAN. 14 "
(8) 0.63 " " " JAN. 15 " " JAN. 16 "
(9) 1.41 " " " JAN. 20 " " JAN. 21 "
(10) 0.01 " " " FEB. 1 " " JAN. 31 "
(11) 0.01 " " " FEB. 28 " " MAR. 1 "
(12) 0.09 " " " JUN. 9 " " JUN. 8 "

ACTIVITY ORIENTED CORRECTIONS TO TABLE IV-22

NOTES	DATE OF STORM (JULY '69 TO JUN '70)	RUNOFF IN INCHES	MASS EMISSIONS DUE TO STORM (lbs. x 10^3)					
			COD	TSS	TN	OPP	HEM	FM
	CORRECTED MASS EMISSIONS							
	SUB-TOTAL FROM JULY TO DEC. 1969							
A	(22 STORMS)	6.000	5234	12462	262	43.6	544	105
B	(12 ")	4.881	3183	6946	159	26.5	367	64
C	(12 ")	4.878	3018	6872	151	25.1	343	60
D	(22 ")	5.997	5069	12388	254	42.2	520	101
	SUB-TOTAL FROM JAN. TO JUNE 1970							
A	(41 STORMS)	7.550	9574	22944	478	79.4	921	191
B	(14 ")	4.402	3627	8044	181	30.2	437	72
C	(9 ")	4.391	2444	5223	122	20.4	310	49
D	(36 ")	7.539	8391	20123	419	69.6	794	168
	GRAND TOTAL FROM JULY 1969 TO JUNE 1970							
A	(63 STORMS)	13.550	14808	35406	740	123.0	1465	296
B	(26 ")	9.283	6810	14990	340	56.7	804	136
C	(21 ")	9.269	5462	12095	273	45.5	653	109
D	(58 ")	13.536	13460	32511	673	111.8	1314	269
	A.. MASS EMISSIONS FROM TABLE IV-22 (ALL STORMS)							
	B.. " " " TABLE IV-22 (FOR STORMS CORRECTED)							
	C.. " " " TABLE IV-23 (FOR STORMS CORRECTED)							
	D.. =(A-B+C) = CORRECTED MASS EMISSIONS (ALL STORM)							

TABLE IV-24

DUE TO STORM COMBINED SEWER EMISSIONS

(BASED UPON 62-YEAR RECORD)

CONSTI-TUENT	POUNDS PER EVENT	POUNDS PER YEAR (82 EVENTS)
COD	2.7×10^5	$22{,}000 \times 10^3$
TSS	5.8×10^5	$47{,}500 \times 10^3$
TN	1.3×10^4	$1{,}070 \times 10^3$
OPP	2.2×10^3	180×10^3
HEM	2.7×10^4	$2{,}200 \times 10^3$
FM	5.4×10^3	440×10^3

TREATMENT RATE VS. OVERFLOW

62-YEAR CLOCK HOUR RAINFALL RECORD

Treatment Rate Equiv. Clock hour Rainfall - iph	% of Total Retained	% of Total Overflowing	No. of Hours of Overflow
0.00	0	100%	381
0.01	6	94	263
0.02	32	68	206
0.03	42	58	168
0.04	50	50	141
0.05	57	43	117
0.06	63	37	100
0.07	68	32	86
0.08	72	28	72
0.09	75	25	62
0.10	78	22	53
0.15	88	12	27
0.20	94	6	14
0.25	97	3	9
0.50	99+	1-	0.5

Annual average rainfall = 20.33"

COMPARATIVE ANNUAL "DUE TO STORM" EMISSIONS

UNDER EXISTING CONDITIONS

CONSTITUENT	EMISSIONS (lbs x 10^3)			RANGE RATIO (HIGHEST TO LOWEST)
	METHOD 1 1969-70 (1)	METHOD 2 (2)	62-YEARS OF RECORD (3)	
COD	10,000	9,200	22,000	2.40 : 1
TSS	24,000	22,000	47,500	2.16 : 1
TN	500	460	1,070	2.32 : 1
OPP	84	76	180	2.37 : 1
HEM	1,000	890	2,200	2.47 : 1
FM	200	180	440	2.45 : 1

(1) 68% of Masses from Table IV-20

(2) 68% of Masses from Table IV-22

(3) Masses from Table IV-24

THE EFFECTS OF STORMWATER RETENTION BASINS UPON STORM FREQUENCIES HANDLED BY A COMBINED SEWER SYSTEM

The location of stormwater retention or storage basins in any particular sewer system has a beneficial effect on the available downstream conduit transport capacity in terms of the return frequencies of historical rates of rainfall that can be handled. The selection of storage basin locations within any stormwater conveyance system can be made such that the main trunk sewers of the system downstream of the basins will be upgraded with regard to the equivalent storm frequency of runoff that may be conveyed before exceeding the sewer capacity. This is best illustrated by a practical example of the use of storage basins.

The example to be presented herein assumes the following:

1. The volume of storage facilities considered must adhere to the following criteria:
   (a) The storage volumes utilized shall not be less than 1/2 million cubic feet; this restriction stems from the consideration of economics of construction of such basins.

(b) The required volume for storage is equivalent to the volume of runoff derived from 1" of rainfall on the contributing fraction of the watershed which is not already tributary to a basin. This is based upon the frequency of overflow of such basins which historically would occur when used in conjunction with the next criterium.

2. The evacuation of flow out of storage is continuous and is equivalent to the rate of runoff from a steady state rate of rainfall of 0.10 in/hr. from all upstream tributary areas. This criterium, in conjunction with 1(b) above, provides a storage volume which historically will overflow only one time every five years.

3. The return frequencies of rainfall rates and rainfall volumes are independent random occurrences in the example under consideration.

4. The rational formula, $Q = CIA$, adequately describes the relation between rainfall and runoff rate.

minutes and seconds obtained from Figure V-31 and V-31A and the 5-year return of rainfall rates. These conditions apply to both the uncontrolled situation and to Alternative 1, shoreline retention only.

Figure V-31C and V-31D are schematic diagrams depicting similar conditions for Alternative 2, a single upstream basin with a shoreline basin. Table V-13 tabulates the altered flow conditions and the 100 year frequency rates.

Figure V-32 is a schematic lime diagram of the upstream system which depicts the altered situation resulting from the integration of multiple upstream storage basins into the system under Alternative 3. The flows out of the storage basins have been indicated and the nodal times of concentration and/or areas adjusted accordingly. Figure V-32A depicts the total system for Alternative 3.

Table V-13A is a summary of the flow conditions at the nodes derived from the conditions depicted in Figure V-32 and V-32A and the 100-year rainfall return frequency rates.

Table V-14 is a comparison of 5-year flow rates to 100-year flow rates for each conduit and the adequacy of the system relative to 5-year flows before the addition of basins

The drainage system utilized in this demonstration is the Selby sewer system serving the 3763-acre watershed located in the southeast section of San Francisco which is a combined sewer system.

Three alternative retention basin systems were investigated; Alternative 1, which has only one shoreline retention basin serving the entire watershed; Alternative 2, which has one single upstream basin coupled with a shoreline basin together serving the entire water shed, and; Alternative 3, which utilizes 5 upstream basins and a shoreline basin to service the total watershed. Each of these systems will meet the design criteria stated above. There are however significant differences in the effects of each alternate upon the watershed.

Figure V-31 is a schematic line diagram of upstream portion of the system which depicts the outlet, the trunkline, three major branches, 9 major junctions, (hereinafter referred to as nodes) together with tributary areas in acres, times of concentration and direction of flows. Figure V-31A depicts the total system.

Table V-12 is a summary of the flow conditions at the nodes derived from the areas and times of concentration in

under each Alternative. This example illustrates the ancillary benefits in terms of upgrading the system capacity which can be derived from the usage of storage facilities in the upper reaches of a combined sewer system or a storm water system when storage is required to control overflows.

The procedure for calculating the values in Table V-13 are as follows:

A. Flows derived for 100-year frequency rainfall rates were calculated for conduits downstream of each storage basin as follows:

$$Q_{100}\ (\text{Total}) = Q_{box} + kQ'_5$$

where k = ratio I_{100}/I_5; simplified in this study by assuming k = 1.5 for Tc = 5 to 10 minutes

k = 1.6 Tc = 11 to 20 minutes

k = 1.7 Tc = 20 minutes

and,

$Q_{'5}$ = CI'_5 (Original Tributary Area-Basin Intercepted Area) I'_5 being derived using a Tc = 5 min. + run time from basin intercepted area.

B. Q_{100} (Total) of the reduced tributary area is compared to Q_5 for the total upstream area calculated in Table V-12 for each reach; and

1. if Q_{100} is less than Q_5 then proceed to next downstream node;
2. if Q_{100} is greater than Q_5 return upstream and intercept a larger area by relocating the retention basin.

C. At junction points of major branches:

1. The greater of the times of concentration of flows from each of the joining branches is used when going out of the node.
2. The tributary area from each branch extends to the nearest basin located upstream.
3. Drainage from all basins upstream is added to tributary area flow.

Certain assumptions were made in analyzing the Alemany system. These are as follows:

(1) Inlet time at the head-end of each reach equals 5 minutes.

(2) Time of concentration for $Q_{5\text{-year}}$ between any two nodes equals time of concentration for $Q_{100\text{-year}}$. This is the ideal case where the basins can be located precisely such that the conduits are flowing full with $Q_{100\text{-year}}$. This may not be practical, but this assumption will result in conservative flows in most cases.

This example aptly illustrates the potential benefits to the conveyance system resultant from the installation of retention basins. For sewers in the City larger than 3'0, it is estimated that the total cost to replace all sewers with inadequate capacity in this size range is $\$77 \times 10^6$. The cost of basins will be offset to some degree by the value of the basin in terms of the equivalent costs of installing adequate sewers in those areas where inadequacies now exist. All conceptual design costs will be evaluated with regard to this aspect.

In the Selby sewer system for example, there are $22.5 million worth of inadequacies. The following summary illustrates basin and sewer inadequacy. The/costs in millions of 1974 dollars associated with each alternative presented in this example.

	Alt.1	Alt.2	Alt.3
Cost of Shoreline Basin (Million)	$66.5	$40.0	$40.5
Cost of Upstream Basin(s) (Million)	-	22.2	24.0
Cost of Inadequate Sewers(Net)(Million)	22.5	4.0	2.6
Total ($-Millions)	$89.0	$66.2	$67.1

In this example the use of upstream retention results in a net savings in total costs of about 25 percent (22 million). Further the cost differences between multiple upstream basin are negligible with the slight additional basin costs for multiple basins being offset by savings in sewer system replacements for inadequacies.

There are additional differences between the two upstream retention systems which cannot be quantified in costs. For example, the multiple upstream basin system upgrades the conduit capacity of more of the existing system and provides better flood control as compared to the single upstream basin system. The use of multiple basins enchances the possibilities for optimum control of spacially and temporally discontinuous storm occurrences. Further the total amount of disruption to normal surface transportation activities will be less with the multiple basin system due to the reduction in sewer reconstruction which would be required. Finally multiple basins provide a degree of standby for each other in case of component failures.

All of these benefits point to the desirability and perhaps necessity of multiple basin systems where feasible.

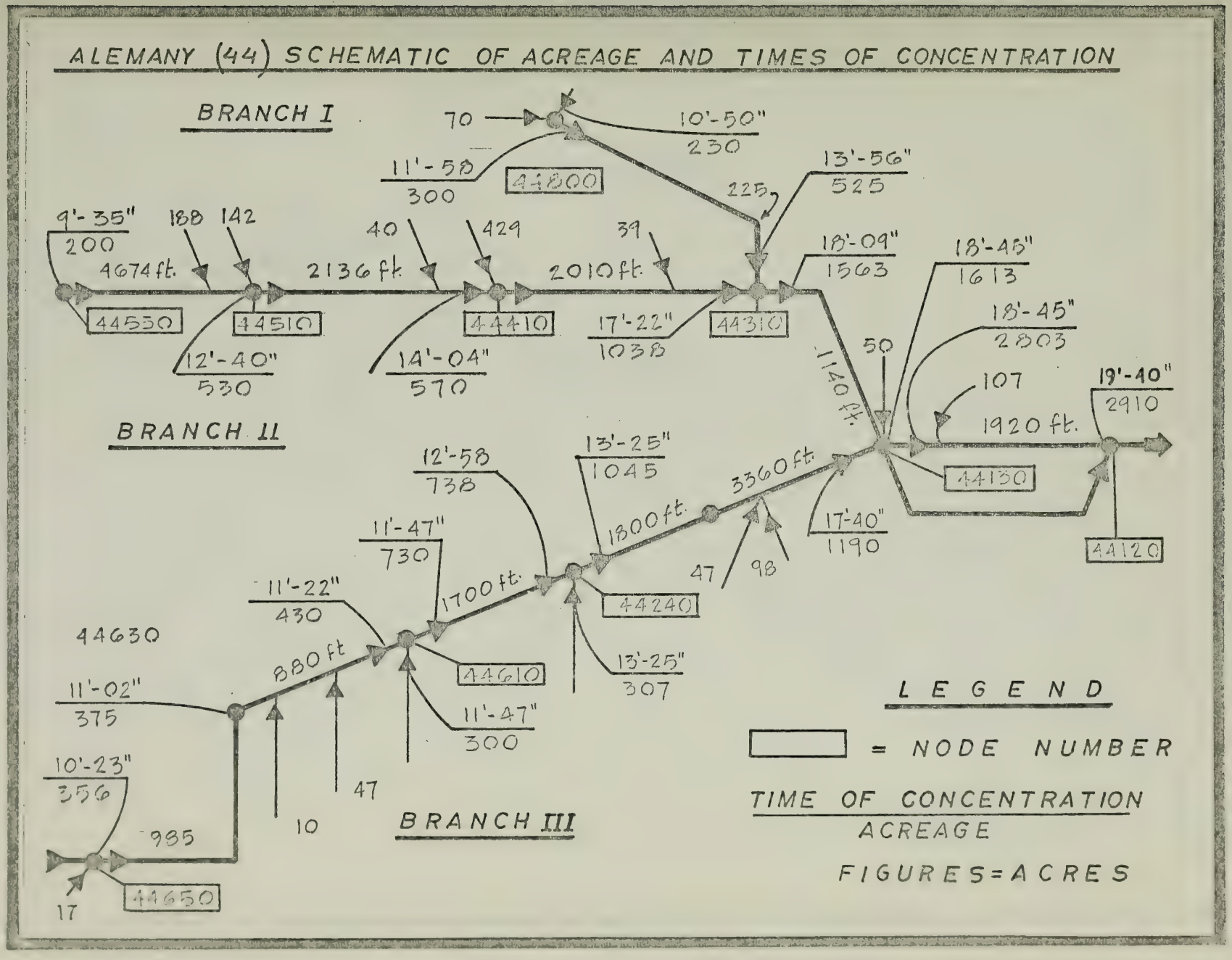

ALEMANY (44) SCHEMATIC OF ACREAGE AND TIMES OF CONCENTRATION
BRANCH I
BRANCH II
BRANCH III
70
10'-50"
230
11'-58
300
44800
225
13'-56"
525
9'-35"
200
188
142
4674 ft.
40
429
2136 ft.
39
2010 ft.
18'-09"
1563
18'-45"
1613
18'-45"
2803
44550
44510
44410
44310
17'-22"
1038
12'-40"
530
14'-04"
570
1140 ft.
50
107
19'-40"
2910
1920 ft.
44130
44120
12'-58
738
13'-25"
1045
3360 ft.
1800 ft.
17'-40"
1190
47
98
11'-47"
730
1700 ft.
44240
11'-22"
430
44630
880 ft
44610
13'-25"
307
11'-02"
375
11'-47"
300
10'-23"
356
985
10
47
17
44650
LEGEND
= NODE NUMBER
TIME OF CONCENTRATION
ACREAGE
FIGURES=ACRES

FIGURE V-31

FIGURE V-31A

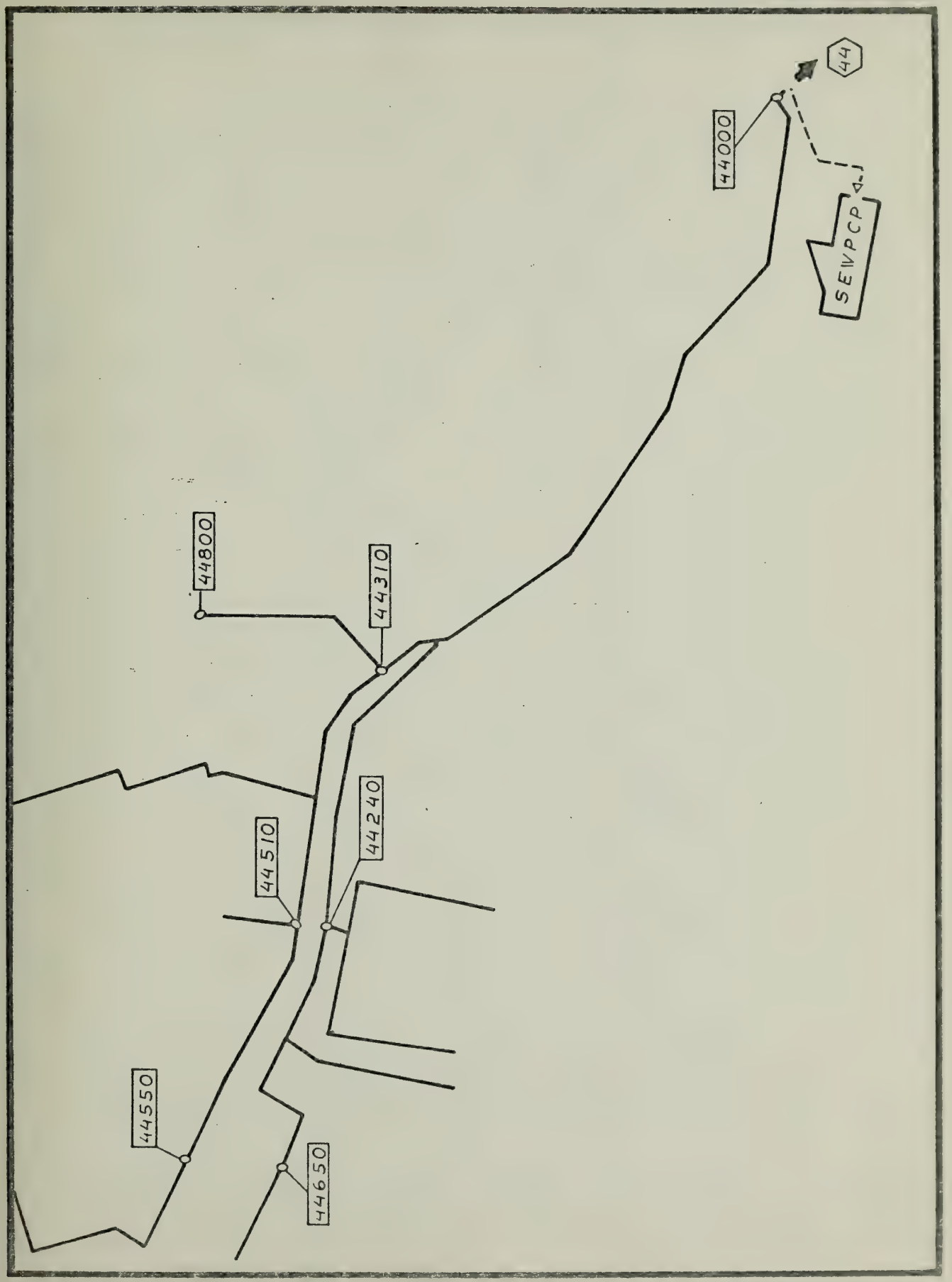


FIGURE V-31B

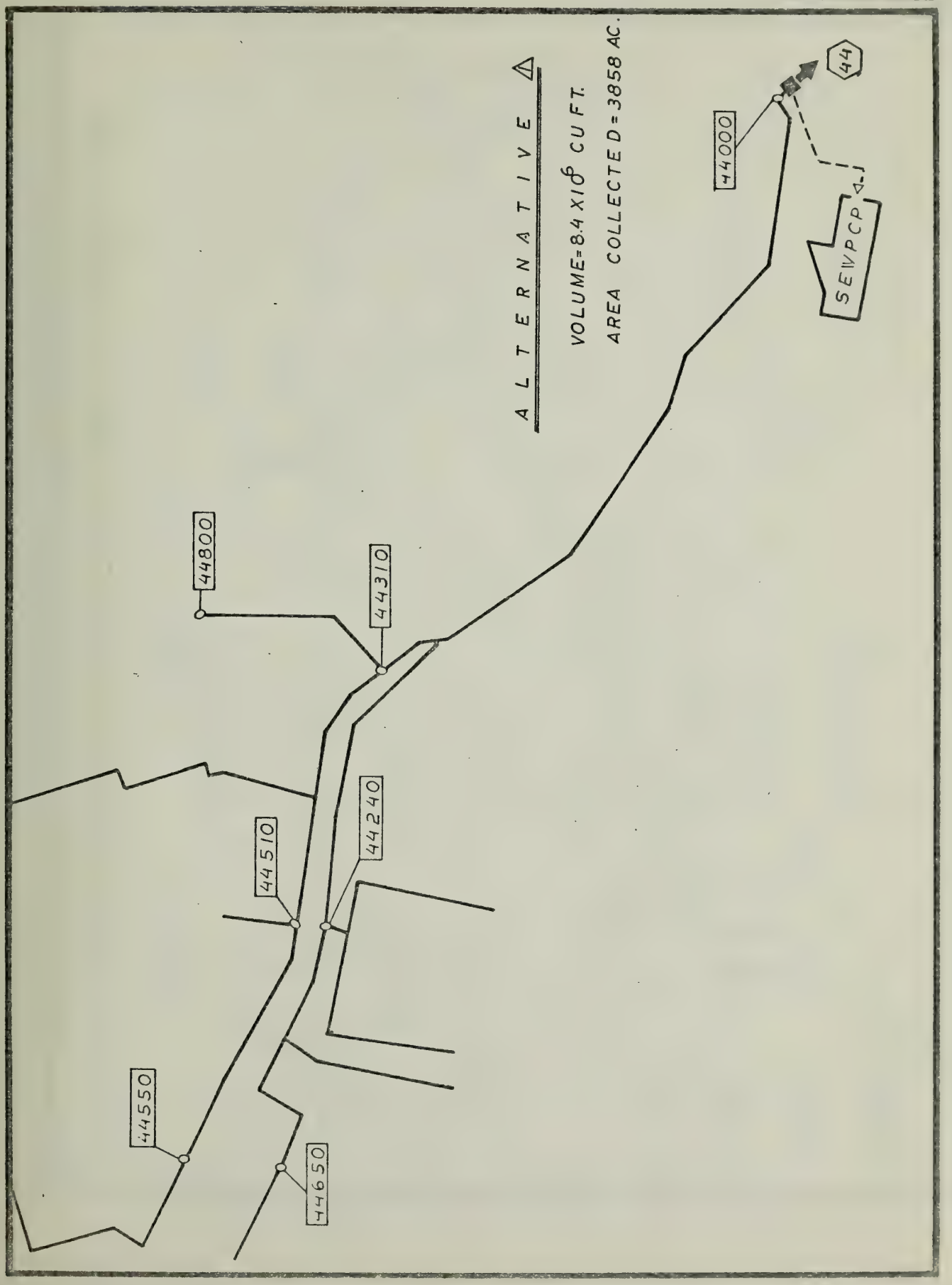
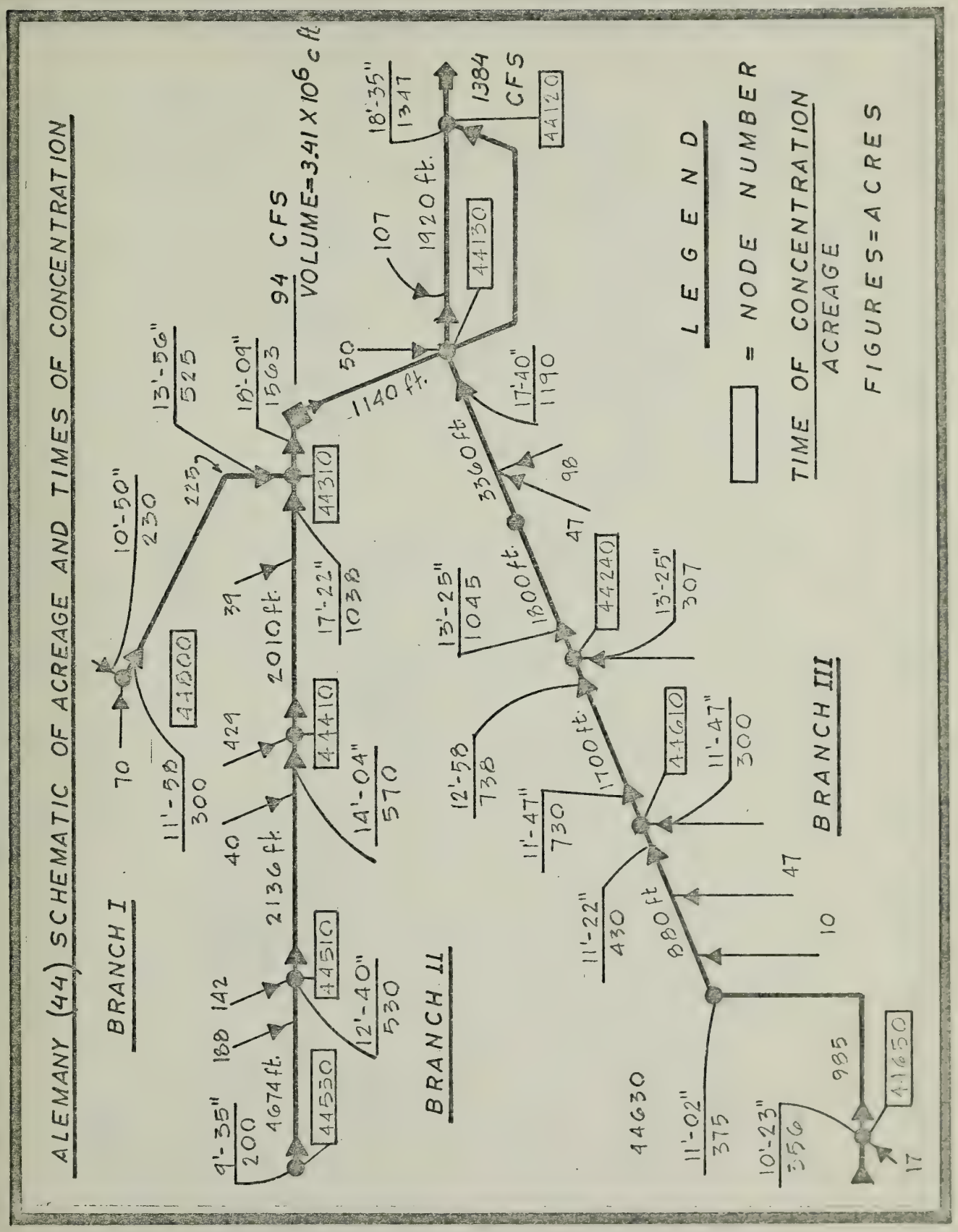

ALTERNATIVE
VOLUME=8.4 X10⁶ CU FT.
AREA COLLECTED = 3858 AC.
44
44000
SEWPCP
44800
44310
44240
44510
44550
44650

FIGURE V-31 C


ALEMANY (44) SCHEMATIC OF ACREAGE AND TIMES OF CONCENTRATION
BRANCH I
BRANCH II
BRANCH III
94 CFS
VOLUME=3.41 X 10⁶ c ft
1384 CFS
LEGEND
= NODE NUMBER
TIME OF CONCENTRATION
ACREAGE
FIGURES=ACRES
44800
44410
44310
44510
44550
44130
44120
44240
44610
44630
41650
9'-35" 200
10'-50" 230
11'-58 300
13'-56" 525
18'-09" 1503
18'-35" 1347
17'-40" 1190
17'-22" 1038
14'-04" 570
12'-40" 530
13'-25" 1045
13'-25" 307
12'-58 738
11'-47" 730
11'-47" 300
11'-22" 430
11'-02" 375
10'-23" 356
70
225
39
429
40
2136 ft.
2010 ft.
1140 ft.
50
107
1920 ft.
98
47
3360 ft.
1800 ft.
1700 ft.
880 ft.
47
10
985
17
4674 ft.
180
142

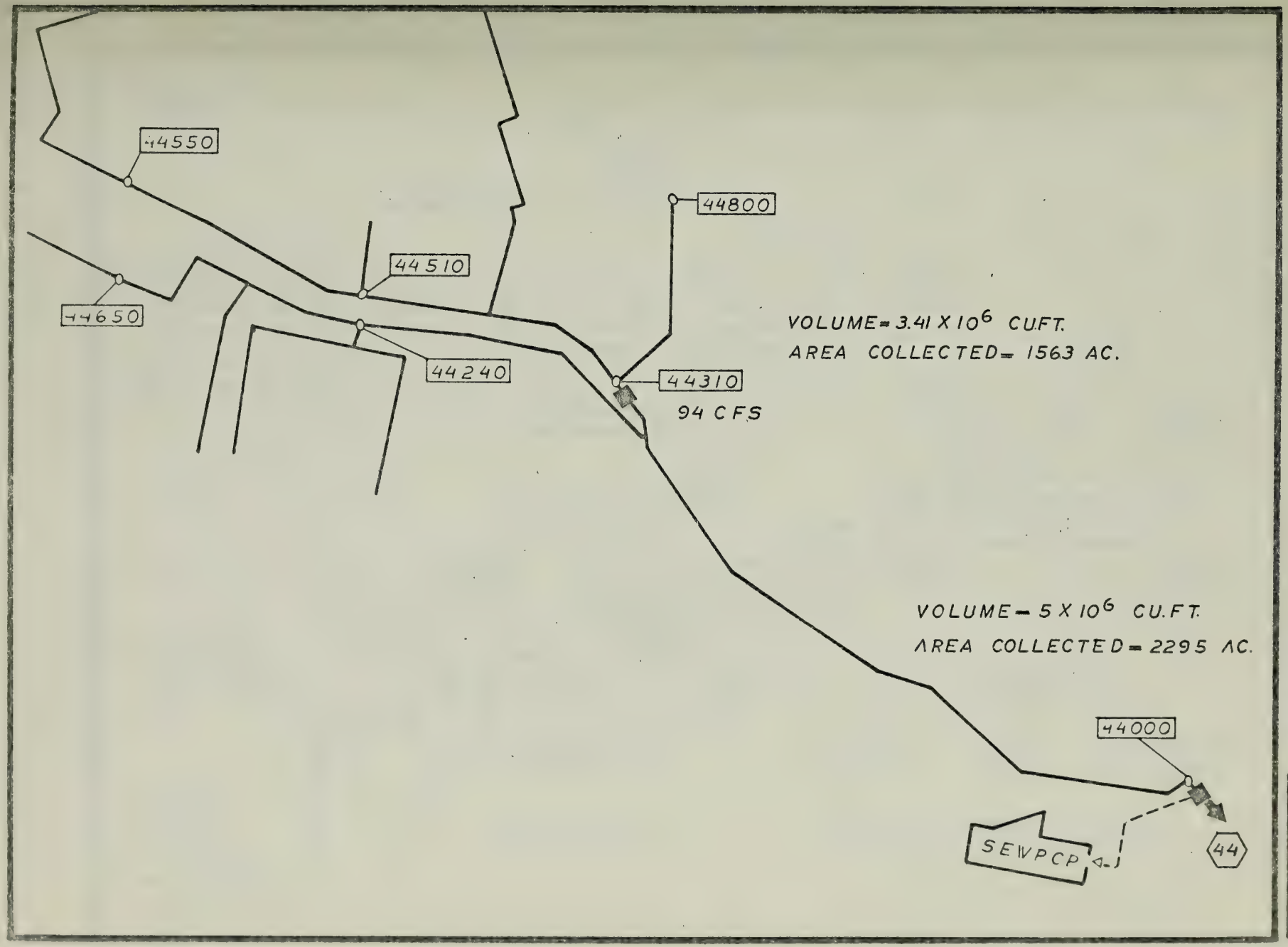

44550
44800
44510
44650
44240
44310
94 CFS
VOLUME = 3.41 X 10^6 CU.FT.
AREA COLLECTED = 1563 AC.
VOLUME = 5 X 10^6 CU.FT.
AREA COLLECTED = 2295 AC.
44000
SEWPCP
44

FIGURE V-31D

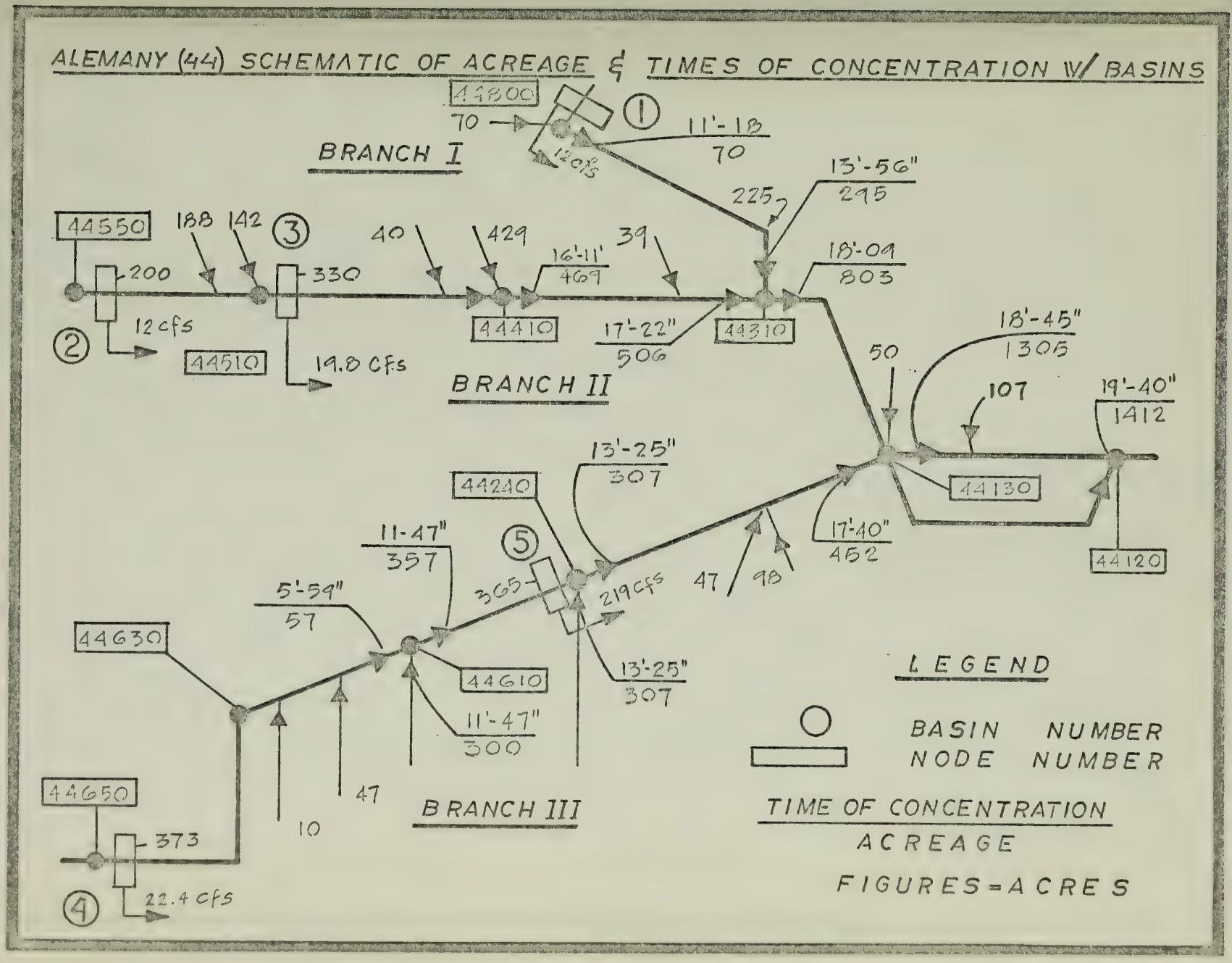

ALEMANY (44) SCHEMATIC OF ACREAGE & TIMES OF CONCENTRATION W/ BASINS
44800
70
①
11'-18
70
12 cfs
BRANCH I
225
13'-56"
295
44550
188
142
③
40
429
16'-11"
469
39
18'-04
803
200
330
12 cfs
②
44410
17'-22"
506
44310
44510
19.8 cfs
BRANCH II
50
18'-45"
1305
107
19'-40"
1412
13'-25"
307
44240
44130
11-47"
357
⑤
17'-40"
452
44120
5'-59"
57
365
219cfs
47
98
44630
44610
13'-25"
307
11'-47"
300
44650
373
10
47
BRANCH III
22.4 cfs
④
LEGEND
BASIN NUMBER
NODE NUMBER
TIME OF CONCENTRATION
ACREAGE
FIGURES = ACRES

FIGURE V-32

FIGURE V-32A

ALTERNATIVE 3
VOLUME=5.05 X 10⁶ CU FT.
AREA COLLECTED – 2360 AC.
RETENTION BASIN
44800
44310
44240
44510
44550
44650
44000
44
SEWPCP
1
2
3
4
5

BRANCH

OUTFALL: ALEMANY (44)
5-year FLOWS

K= 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5) = Q 100 .

	CONDUIT		Tc		R	ACRES		"C"	Q 5	Qbox	Q_t	Q_{100}	REMARKS
	From Node	To Node	Incr	Cumu @ Lower Node	5-yr	Incr	Cumu @ Lwr Node		5-yr		5-yr	100-yr	CONDUIT LENGTHS
BRANCH I	Water-shed	44810		10'-50"	2.22		230	.52	266				-
	44810	44800	0'-28"	11'-18"	2.17	70	300	.52	338				300'
	44800	44310	2'-40"	13'-58"	1.93	225	525	.51	520				2915'
BRANCH II	Water-shed	44550		9'-35"	2.37		200	.6	284				-
	44550	44510	3'-05"	12'-40"	2.03	188	388	.6	473				4674'
	44510	44410	1'-24"	14'-04"	1.91	142 +40	570	.6	653				2136'
	44410	44310	1'-11"	16'-11" (a) 17'-22"	1.68	429 +39	1038	.6	1050				2010'
	44310	44130		18'-45"	1.59	527 + 50	1613	.6	1540				1140'
BRANCH III	Water-shed	44650		10'-23"	2.27		356	.6	485				-
	44650	44630	0'-39"	11'-02"	2.20	17	373	.6	493				1765'
													TABLE I pg. 1 of 2

(a) longest Tc at upstream Node

TABLE V-12

BRANCH

OUTFALL: ALEMANY (44)
5-year FLOWS

K= 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5) = Q 100

CONDUIT		T c		R	ACRES		"C"	Q 5	Qbox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ Lower Node	5-yr	Incr	Cumu @ Lwr Node		5-yr		5-yr	100-yr	CONDUIT LENGTHS
44630	44610	0'-20"	11'-22"	2.16	57	430	.6	558				880'
44610	44240	1'-11"	11-47"(a) 12'-58"	2.00	300 + 8	738	.6	886				1700'
44240	44130	4'-15"	13'-25"(a) 17'-40"	1.68	307 + 145	1190	.6	1200				5160'
44130	44120	0'-55"	18'-45" 19'-40"	1.54	1613 + 107	2910	.6	2680				1920'
44120	44100											4165'
44100	44010											4960'
44010	OUTFALL											1210'
												TABLE V pg. 2

(a) longest Tc @ upstream node

BRANCH I

OUTFALL: ALEMANY (44)

K= 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5) = Q 100

CONDUIT		Tb		R	ACRES		"C"	Q'5	Qbox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ Lower Node	5-yr	Incr	Cumu @ Lwr Node		5-yr		5-yr	100-yr	
(1) Water-shed	44810	B A	S I N	0.1	230	- - -	.52	- - -	12	- - - -	- - -	501,000 cu.ft. (Basin 1)
44810	44800		11'-18"	2.17		70	.52	79	12	91	136	vs. 338 O.K.
44800	44310	2'-40"	13'-58"	1.93	225	295	.51	292	12	304	458	vs. 520 O.K.
			ADD	- - - -	295	and	- - - -	- -	12	- - to BRANCH II		

BRANCH II OUTFALL: ALEMANY (44)

K= 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5) = Q 100

CONDUIT		Tc		R	ACRES		"C"	Q 5	Qbox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ Lower Node	5-yr	Incr	Cumu @ Lwr Node		5-yr		5-yr	100-yr	
1) Water-shed	44550	B A S I N		0.1	200	---	.6	---	12			436,000 cu.ft. (Basin 2)
44550	44510	3'-05"	5'-0" 8'-05"	2.57		188	.6	290	12	302	453	vs. 473 O.K.
44510	44410	1'-24"	9'-29"	2.38	142 + 40	370	.6	528	12	540	810	vs. 653 inadequate
3)		B A S I N		0.1	330	---	.6	---	+19.8	- -	- - -	720,000 cu.ft. (Basin 3)
44510	44410	1'-24"	5'-0" 6'-24"	2.85		40	.6	68	31.8	100	150	vs. 653 O.K.
44410	44310	1'-11"	16'-11" 17'-22"	1.67	429 + 39	508	.6	508	31.8	540	864	vs. 1050 O.K.
FROM	BRANCH	I		---	+295	- - - -	- - - -	- - - -	+12			
44310	44130	0'-36"	18'-09" 18'-45"	1.59	+50	853	.6	815	43.8	859	1375	vs. 1540 O.K.
			18'-45"	ADD	----	853 and		-----	43.8	to BRANCH III		

BRANCH III OUTFALL: ALEMANY (44)

K= 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5) = Q 100

CONDUIT		T'c		R	ACRES		"C"	Q'5	Qbox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ Lower Node	5-yr	Incr	Cumu @ Lwr Node		5-yr		5-yr	100-yr	
Water-shed	44650	B A S I N		0.1	373	---	.6	-------	22.4	---------		811,000 cu.ft. (Basin 4)
44650	44610	0'-59"	5'-0" 5'-59"	2.92		57	.6	100	22.4	122	183	vs. 558 O.K.
44610	44240	1'-11"	11'-47" 12'-58"	2.00	300 + 8	365	.6	438	22.4	460	736	vs. 886 O.K.
44240	44130	4'-15"	13'-25" 17'-40"	1.68	307 + 145	817	.6	823	22.4	845	1350	vs. 1200 Inadequate
		B A S I N		0.1	365	--	.6	------	+21.9			795,000 cu.f. (Basin 5)
44240	44130	4'-15"	13'-25" 17'-40"	1.68		452	.6	455	44.3	499	798	vs. 1200 O.K.
	FROM BRANCH II		18'-45"			+853	- - - -	- - - +	43.8			
44130	44120	0'-55"	19'-40"	1.54		1412	.6	1310	88.1	1398	2240	vs. 2680 O.K.

BRANCH I

OUTFALL: ALEMANY (44)
5-year FLOWS

K = 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5)= Q 100

PAGE 1 OF 2

CONDUIT		Tc		R	ACRES		"C"	Q 5	Obox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ LwrNode	5-yr.	Incr.	Cumu @ LwrNode		5-yr.		5-yr.	100-yr	CONDUIT LENGTHS
WATER SHED	44810		10'-50"	2.22		230	.52	266	-	266	425	
44810	44800	0'-28"	11'-18"	2.17	70	300	.52	338	-	338	541	Vs.338 INADEQUATE
44800	44310	2'-40"	13'-58"	2.93	225	525	.51	520	-	520	832	Vs. 520 "
			ADD	- - -	- - - -	525	- - -	- TO	BRANCH II			
WATER SHED	44550		9'-35"	2.37		200	.6	284	-	284		
44550	44510	3'-05"	12'-40"	2.03	188	388	.6	473	-	473	758	Vs. 473 INADEQUATE
44510	44410	1'-24"	14'-04"	1.91	142 +40	570	.6	653	-	653	1045	Vs. 653 "
44410	44310	1'-11"	16'-11" 17'-22"	1.67	429 +39	1038	.6	1050	-	1050	1680	Vs.1050 "
FROM BRANCH I		1'-13"	18'-09"	1.63	525	1563	.6	1530	-	1530	2450	Vs.1530 "
		BASIN		.1	1563	-	.6	-	94	94	151	$.3.41 \times 10^6$ CU.FT(BASI
			18'-09"	ADD -	- - -	- - -	- - -	- - -	- 94 TO	BRANCH III		

TABLE V-13A

BRANCH III

OUTFALL: ALEMANY (44)
5-year FLOWS

K = 1.5 Tc = 5 to 10 min.
= 1.6 Tc = 11 to 20 min.
= 1.7 Tc > 20 min.
(K x Q5)= Q 100

CONDUIT		T c		R	ACRES		"C"	Q 5	Qbox	Q_t	Q_{100}	REMARKS
From Node	To Node	Incr	Cumu @ LwrNode	5-yr.	Incr.	Cumu @ LwrNode		5-yr.		5-yr.	100-yr.	CONDUIT LENGTHS
WATER SHED	44650		10'-23"	2.77		356	.6	485	-		776	
44650	44610	0'-59"	11'-22"	2.16	17 +57	430	.6	558			894	Vs.558 INADEQUATE
44610	44240	1'-35"	12'-58"	2.0	300 8	738	.6	886	-		1420	Vs. 886 "
44240	44130	4'-15"	13'-25" 17'-40"	1.68	307 +145	1190	.6	1200	-		1925	Vs. 1200 "
44130	44120	0'-55"	18'-35"	1.6	107 +50	1347	.6	1290	-		2060	Vs. 1290 "
	FROM BRANCH II								94		151	
44120			18'-35"			1347		1290	94		2220	Vs. 2680

TABLE V-13A

REACH FROM	TO	CONDUIT CAPACITY A	5-YEAR FLOWS TABLE (1) B			5-YEAR % Adequate C = A : B			100-YEAR FLOWS + BASINS (TABLE II)			100-YEAR % ADEQUATE A : D		
ALTERNATIVES			(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
BRANCH I:														
Watershed	44810		266	266					425	425	425			
44810	44800	220	338	338	91	65	65	242	541	541	136	41	41	151
44800	44310	527	520	520	304	101	101	173	486	832	832	63	63	108
BRANCH II														
Watershed	44550		284	284					426					
44550	44510	340	473	473	302	72	72	113	758	758	453	45	45	75
44510	44410	550	653	653	540	84	84	102	1045	1045	150	53	53	366
44410	44310	600	1050	1050	540	57	57	111	1680	1680	864	36	36	70
44310	44130	615	1540	94	859	40	655	72	2465	151	1375	25	407	45
BRANCH III:														
Watershed	44650		485	485					776					
44650	44610	190	558	558	122	34	34	160	894	894	183	21	21	104
44610	44240	910	886	886	460	103	103	198	1420	1420	736	64	64	123
44240	44130	1000	1200	1200	845	83	83	118	1925	1925	798	52	52	125
44130	44120	2740	2680	1314	1398	101	198	196	4300	2220	2240	64	129	122

TABLE V-14

CATCHBASIN

SURVEY

CATCHBASIN SURVEY

Based on chemical analysis of samples taken from and observations made on a number of catchbasins in different areas in the City, it was pointed out in Chapter IV and Chapter V of the Comprehensive Master Plan report that catchbasins are causing a major influence on runoff quality. The results on the physical observations undertaken in different areas in San Francisco are tabulated in Table V-20. Figures V-20A through V-20F show the areas where physical observations were made. The resultant chemical analysis on composite samples taken from different groups of catchbasins is summarized in Table V-21. Figures V-35 to V-45 show the different locations where the catchbasin samples were taken.

CB STUDY - PHASE II - SUMMARY OF RESULTS

AREA - SEE ATTACHED MAP FOR LOCATION	C.B. PHYSICAL CONDITION SURVEY				ODOR TEST	
	OBSERVATIONS					
	TOTAL CB's CHECKED	TRAP	H_2O SEAL	CLEANLINESS & OTHERS	TOTAL MH's CHECKED	ODOR OBSERV.
1a FOLSOM ST. (2nd - 9th)	58	11, 24, 23	7, 4, 12	OUT OF 58 CB's, 24 CB are full of debris beyond Trap & 4 CB's beyond H_2O seal or a total of 28 dirty CB's		
1b 4TH & BLUXOME	186	NO REPORT	NO REPORT	→ 79 CB's Full of debris beyond Trap → 107 CB's CLEAN To Trap		
1a & 1b					245	200, 45
2	198	44, 39, 115	10, 105	39 CB's FULL OF DEBRIS & 33 NEEDS CLEANING OR A TOTAL 72 CB's DIRTY. Also, 3 CB's were reported to have noticeable odor	209	182, 27
3	93	4, 89	0, 89	21 CB's of 93 need Cleaning	37	36, 1
4	43	12, 4, 27	4, 23	4 CB's FULL OF DEBRIS & 7 Need cleaning or a TOTAL 11 CB's OF 43 Are dirty	56	42, 14
5	99	2, 97	5, 92	No report on dirty CB's → 4 CB - W/O CLEANOUT PLUG → 88 CB - WITH " "	65	64, 1
6		NO REPORT ON CB's			7	3, 4
7	48	19, 29	15, 14	18 CB's OF 48 ARE DIRTY	58	57, 1

LEGEND: ⬡ – WITHOUT ☐ – UNCERTAIN (TOO FULL TO DETERMINE) ◯ – WITH

FIGURE V-20A

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)

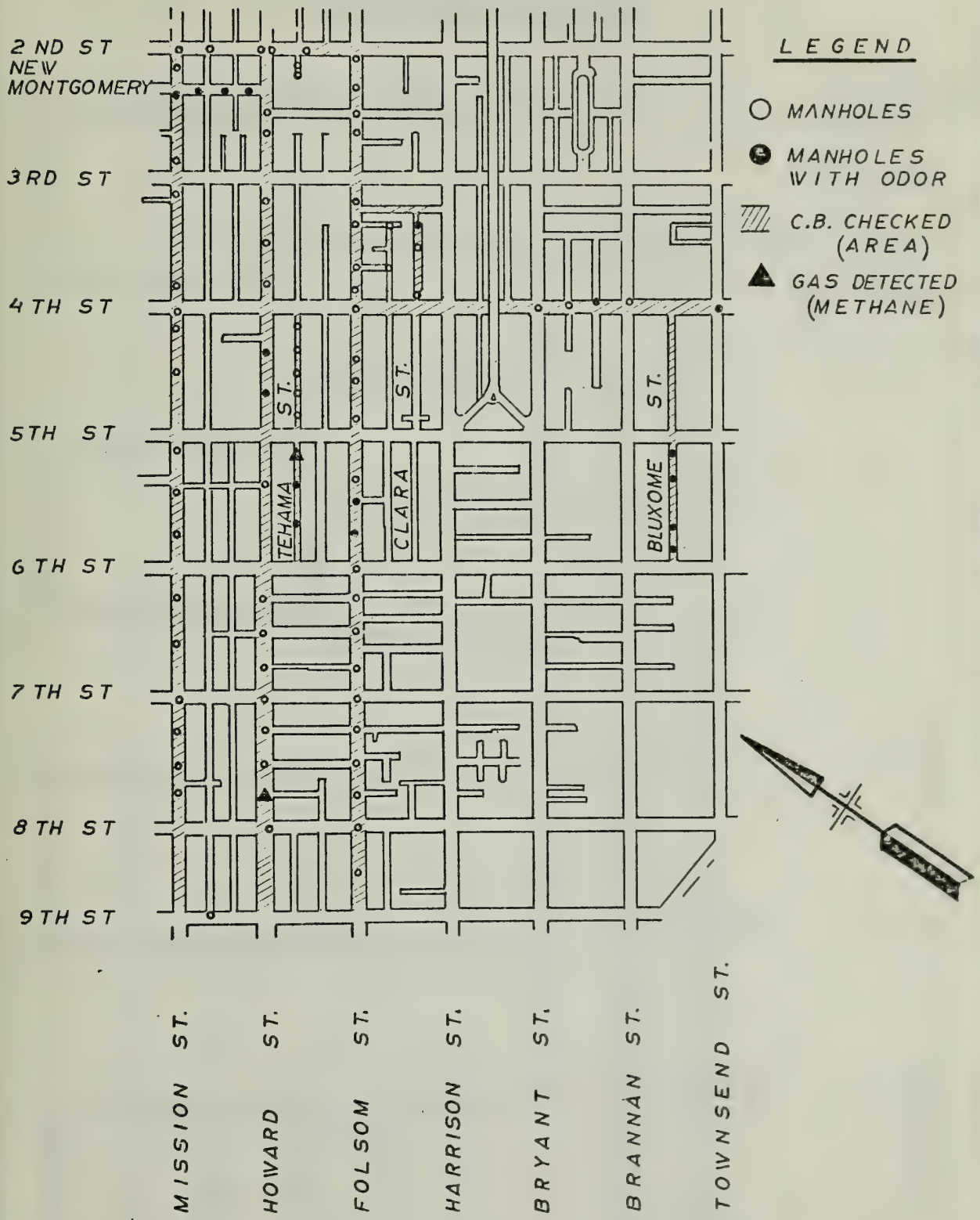


FIGURE V-20B

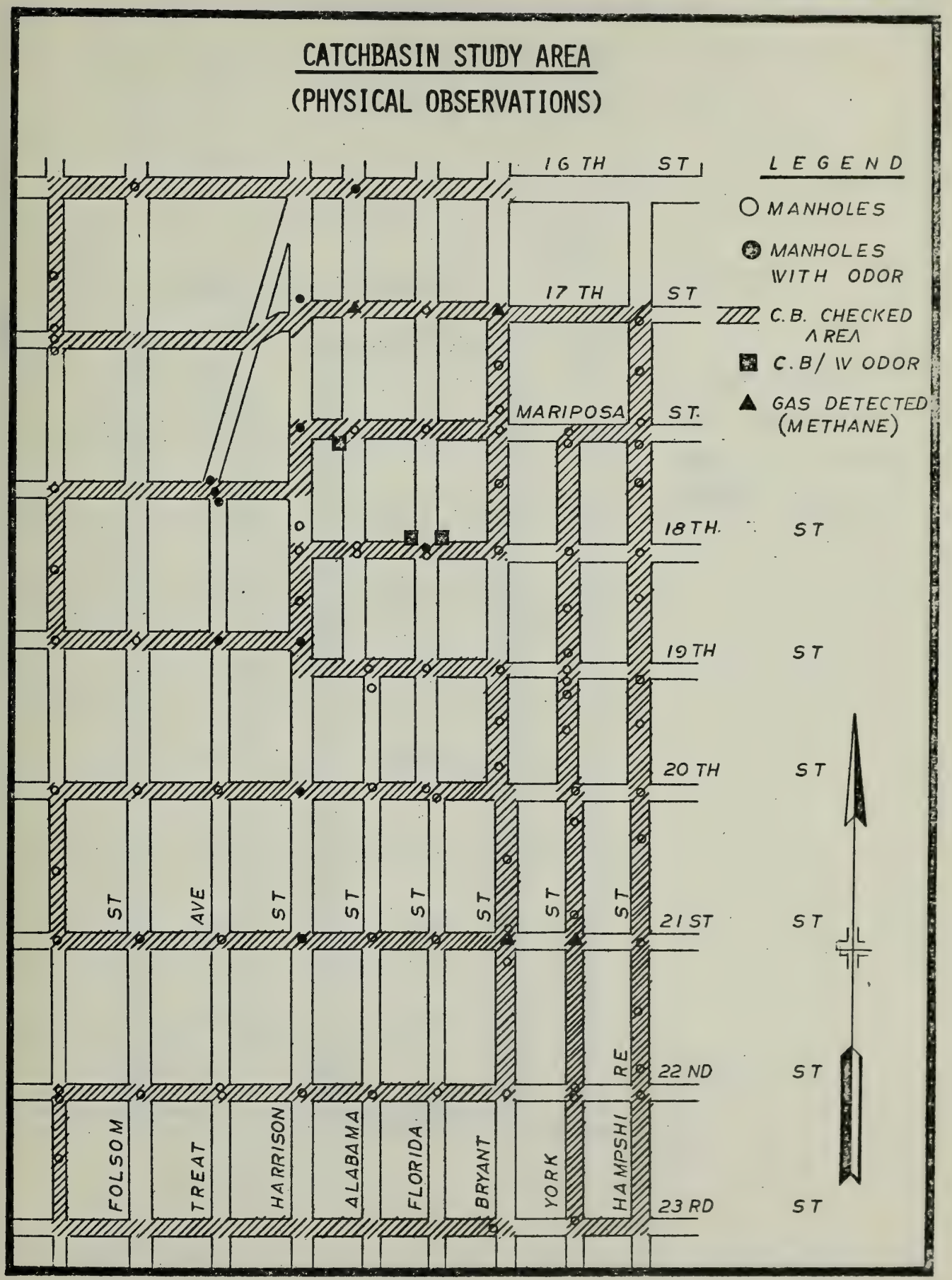
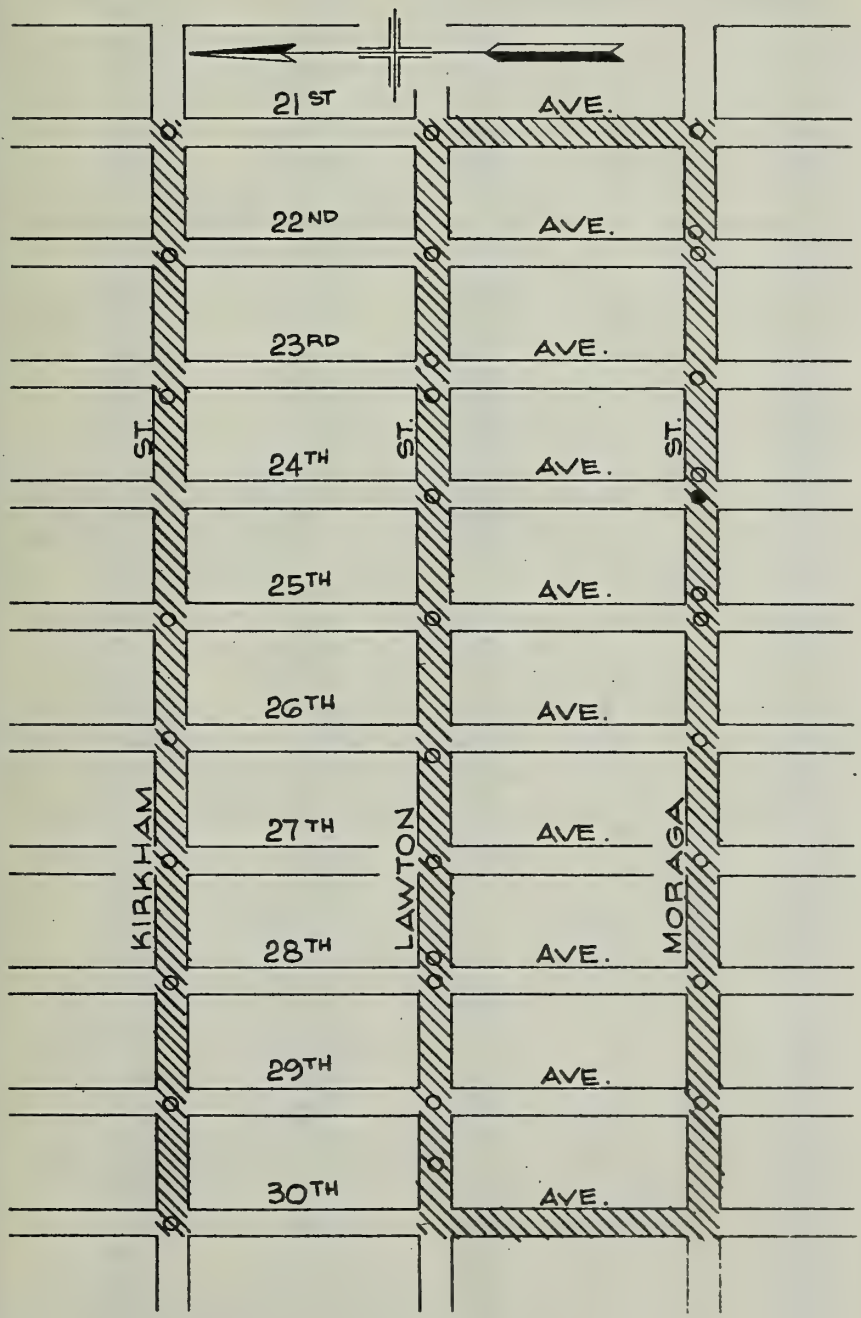

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)
16 TH ST
17 TH ST
MARIPOSA ST.
18TH. ST
19TH ST
20 TH ST
21 ST ST
22 ND ST
23 RD ST
FOLSOM ST
TREAT AVE
HARRISON ST
ALABAMA ST
FLORIDA ST
BRYANT ST
YORK ST
HAMPSHIRE ST
LEGEND
MANHOLES
MANHOLES WITH ODOR
C.B. CHECKED AREA
C.B/W ODOR
GAS DETECTED (METHANE)

FIGURE V-20c

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)



LEGEND

- ○ MANHOLES
- ● " W/ODOR
- ▨ C B CHECKED (AREA)

FIGURE V-2OD

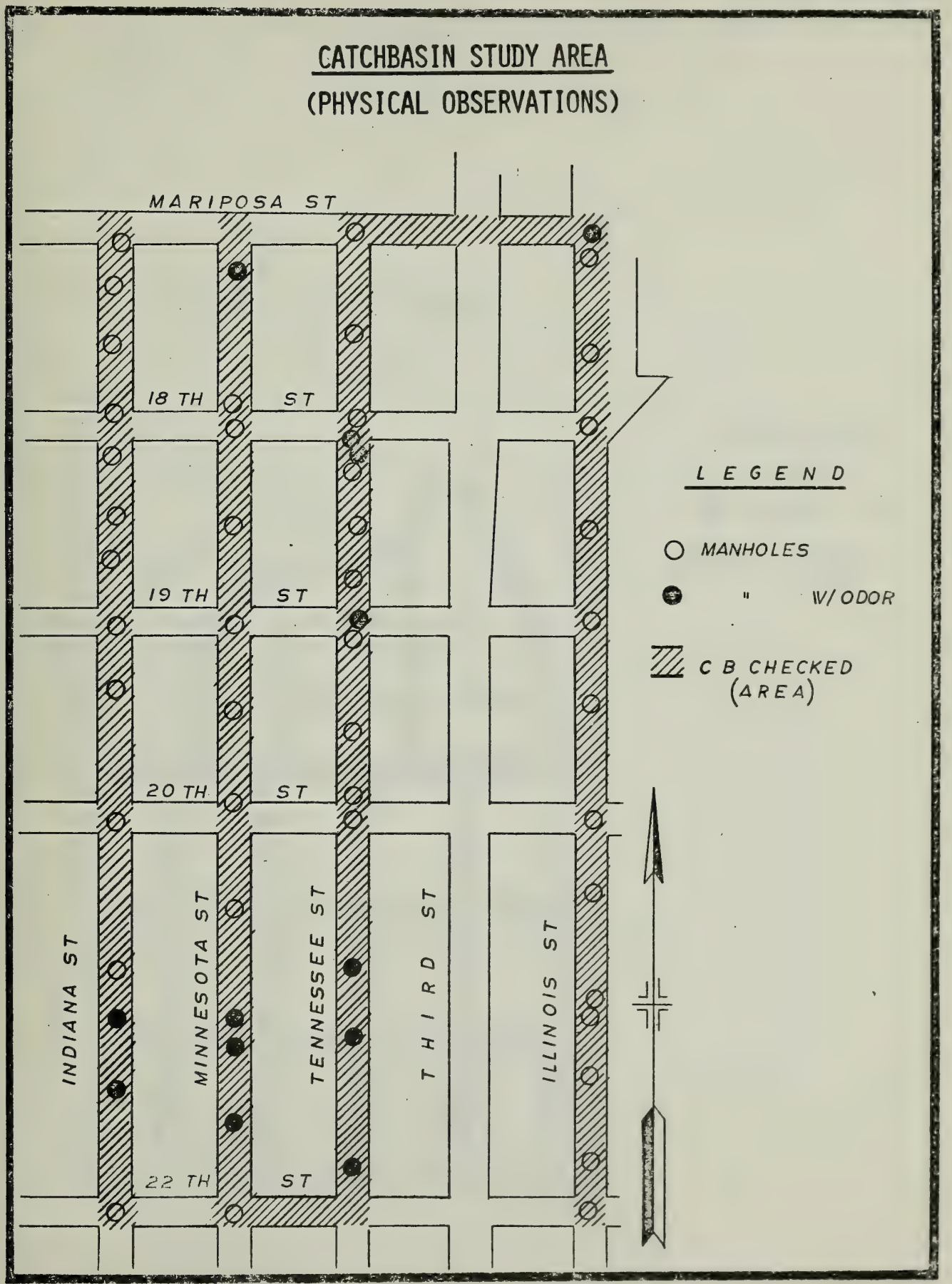
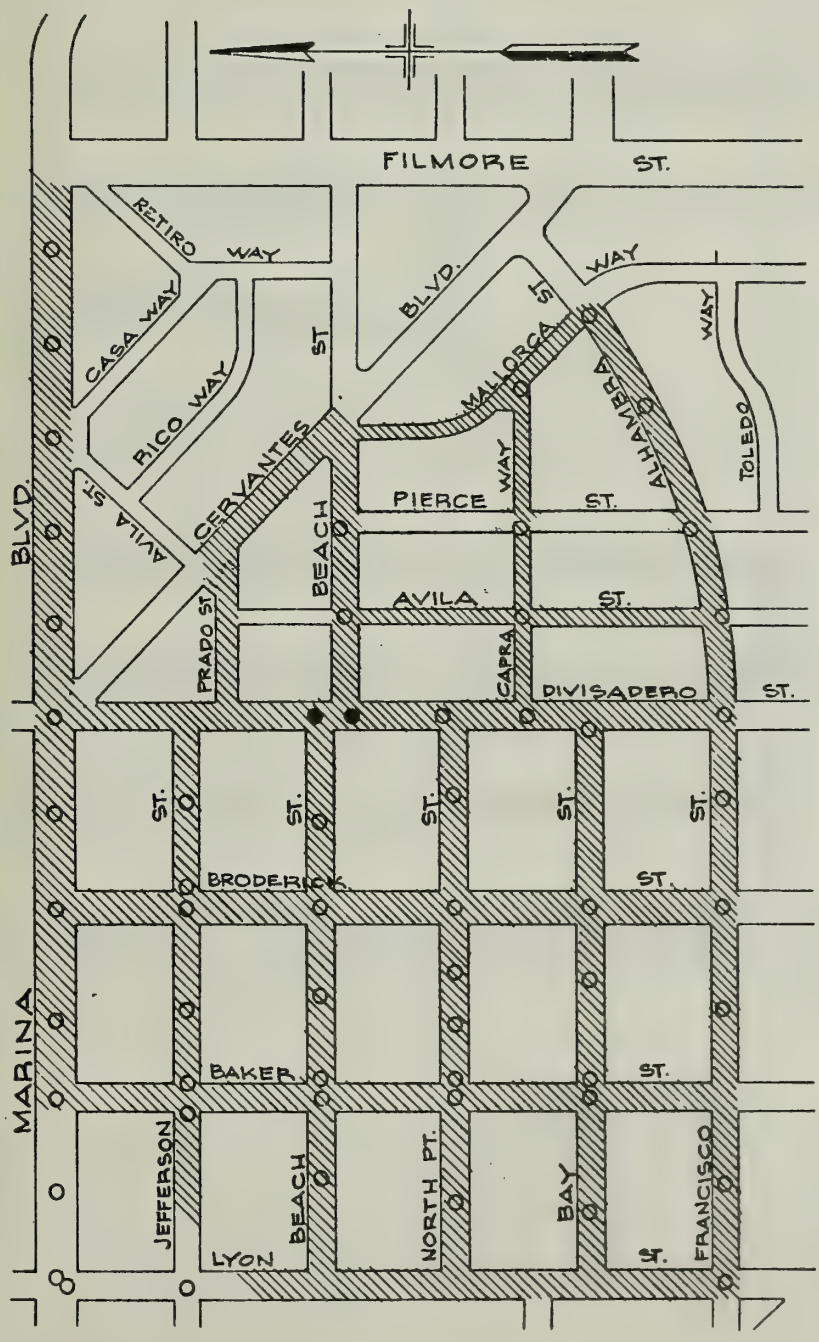

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)
MARIPOSA ST
18 TH ST
19 TH ST
20 TH ST
22 TH ST
INDIANA ST
MINNESOTA ST
TENNESSEE ST
THIRD ST
ILLINOIS ST
LEGEND
MANHOLES
" W/ ODOR
C B CHECKED (AREA)

FIGURE V-20E

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)

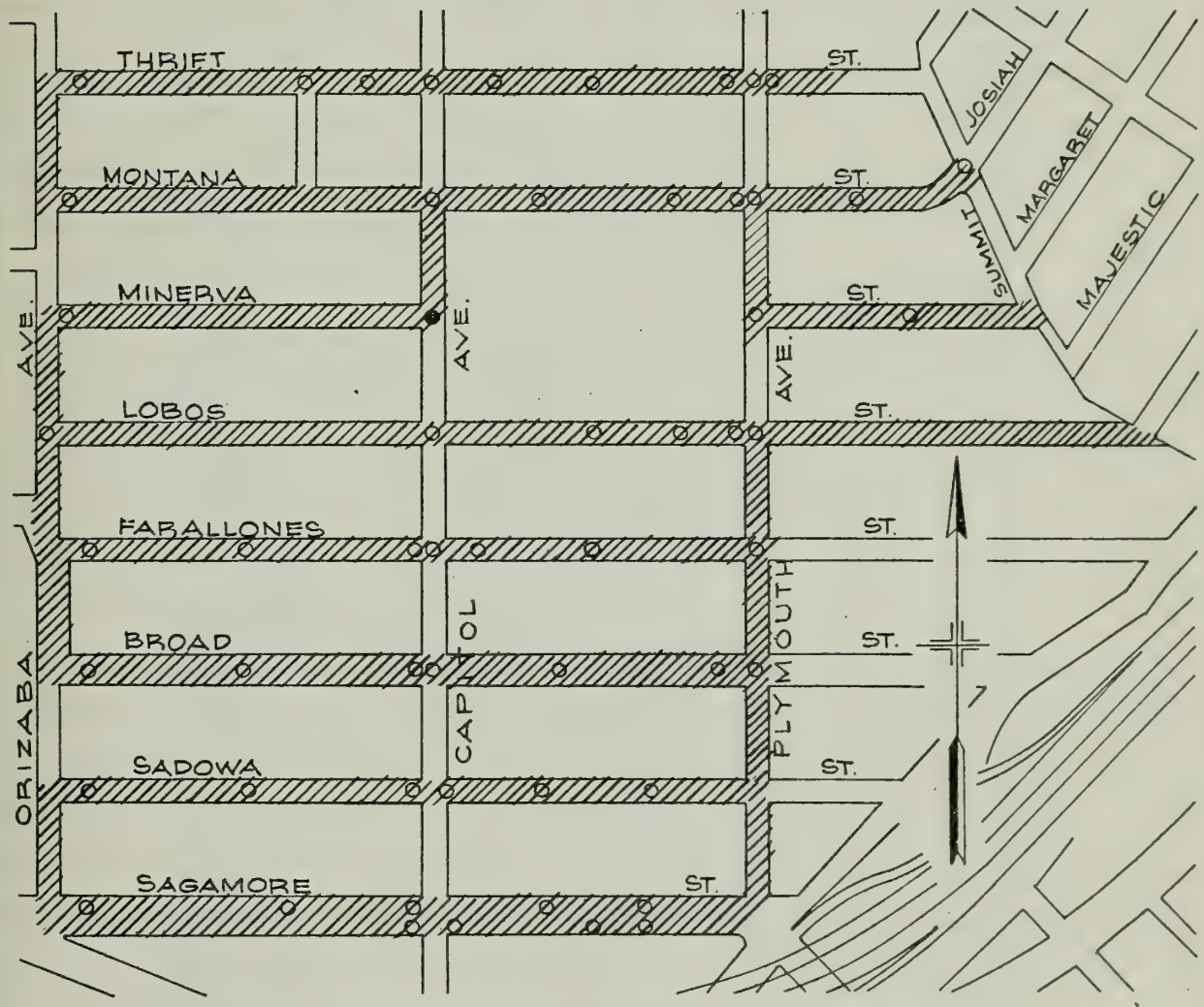


LEGEND

- MANHOLE
- MANHOLE W ODOR
- C.B. CHECKED (AREA)

FIGURE V-20F

CATCHBASIN STUDY AREA
(PHYSICAL OBSERVATIONS)



LEGEND

- MANHOLES WITH ODOR
- MANHOLES
- C.B. CHECKED (AREA)

CB - STUDY - PHASE II - SUMMARY OF CHEMICAL ANALYSIS OF CB SAMPLES

COMPOSITE SAMPLE LOCATION *	SAMPLING DATE	Mg/L								JTU
		COD	5-DAY BOD (20Z)	GREASE	TOTAL SUSPENDED SOLIDS	VOLATILE SUSPENDED SOLIDS	SETTLEABLE SOLIDS	TOTAL NITROGEN	TOTAL PHOSPHORUS	TURBIDITY
Plymouth & Sadowa	11/30/70	3860	190	291	2480	1440	12	10.9	<0.2	40
7th & Hooper	11/30/70	15000	430	595	6390	2740	22	33.2	<0.2	800
YOSEMITE	12/1/70	739	11	114	338	141	2.6	1.8	<0.2	90
40TH & MORAGA	12/1/70	9060	40	107	2650	1871	18	16.1	<0.2	70
MASON & OFARRELL	12/1/70	8100	130	679	2130	1130	21	29.7	<0.2	450
32ND & TARAVAL	12/2/70	153	5	263	78	30	0.5	0.5	<0.2	32
HAIGHT & ASHBURY	12/2/70	37700	1500	5320	13200	8840	17	1.4	<0.2	1100
MARINA Area	12/3/70	701	100	167	223	106	1.5	7.0	<0.2	70
MONTGOMERY ST.	12/3/70	6440	390	615	3280	1290	25	18.8	<0.2	600
WEBSTER & TURK	12/3/70	1440	44	132	1540	337	8.0	14.0	<0.2	130
LOWER SELBY	12/4/70	288	6	36	202	55	0.6	1.4	<0.2	125
UPPER MISSION	12/4/70	5590	50	315	1850	875	8.5	12.0	0.3	450
MASON & OFARRELL	12/11/70	7720	65	865	3190	1570	33	16.5	<0.2	130
40TH & MORAGA	12/11/70	51000	130	7875	4950	4420	15	12.0	<0.2	150
7TH & HOOPER	12/11/70	2570	170	269	1660	660	7	2.0	<0.2	95
YOSEMITE	12/14/70	21400	120	74	518	456	0.1	4.6	<0.2	85
32ND & TARAVAL	12/14/70	708	15	52	224	145	1.3	1.4	<0.2	45
Plymouth & Sadowa	12/14/70	8610	122	128	4148	3296	7.5	2.8	0.3	80
MARINA Area	12/15/70	8600	40	183	1600	1550	0.1	<0.5	<0.2	90
MONTGOMERY ST.	12/15/70	8160	300	425	4020	1050	30	3.9	<0.2	80
HAIGHT & ASHBURY	12/15/70	143100	420	7330	6550	5475	37	14.6	<0.2	65
MASON & OFARRELL	1/11/71	5630	77	314	1760	1050	13	6.4	<0.2	200
MONTGOMERY ST.	1/11/71	3820	61	371	2260	1300	12	24.6	<0.2	102
AVERAGE		15220	194	1149	2851	1758	12.7	10.3	<0.2	223

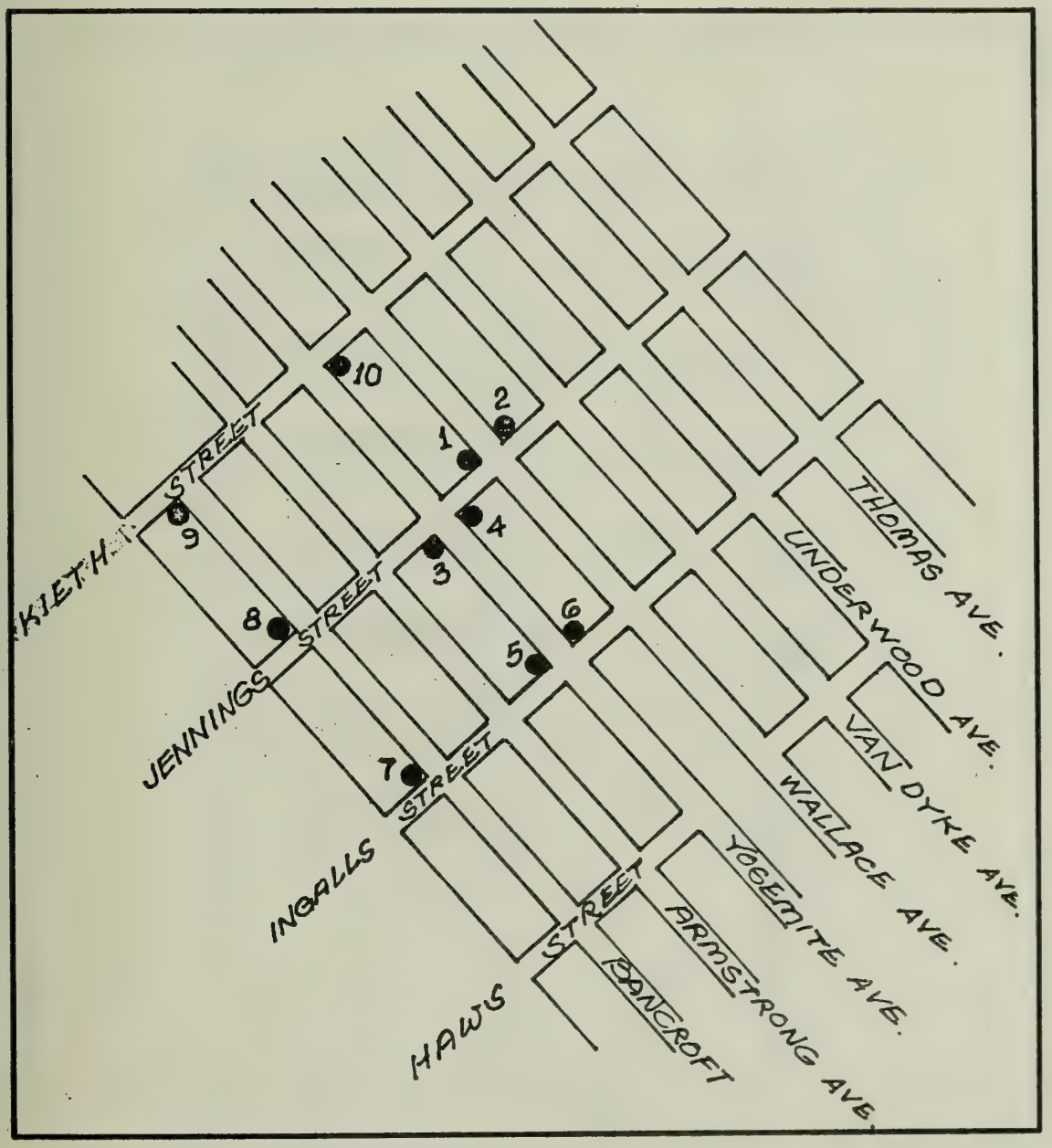
* SEE ATACHED MAPS

FIGURE V-35

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

YOSEMITE

AREA IDENTIFICATION



0' 1200'

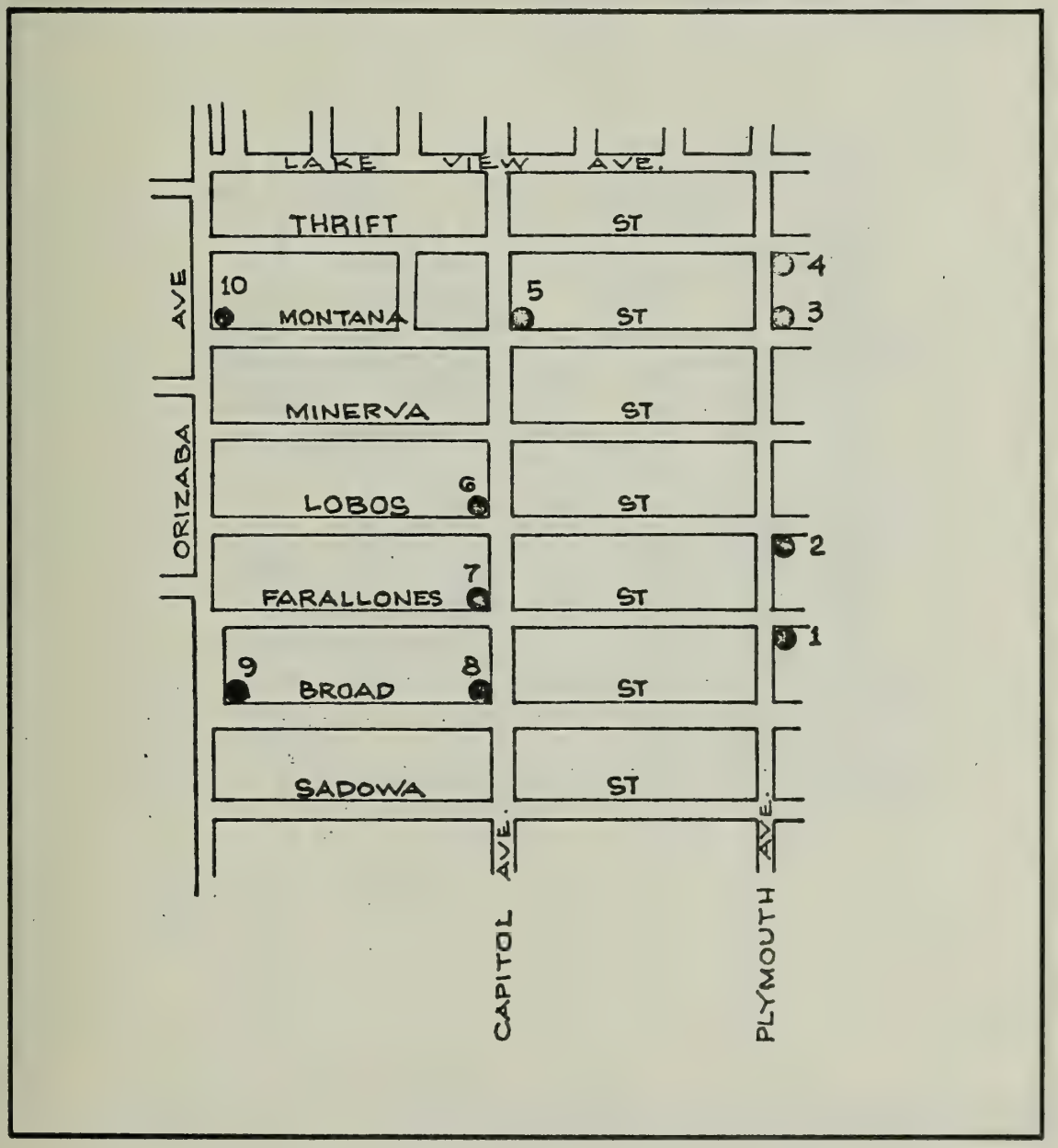
S C A L E

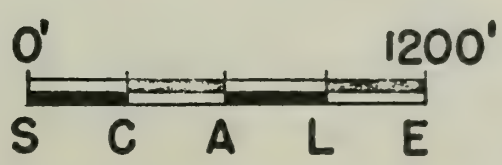
FIGURE V-36

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

PLYMOUTH & SADOWA

AREA IDENTIFICATION





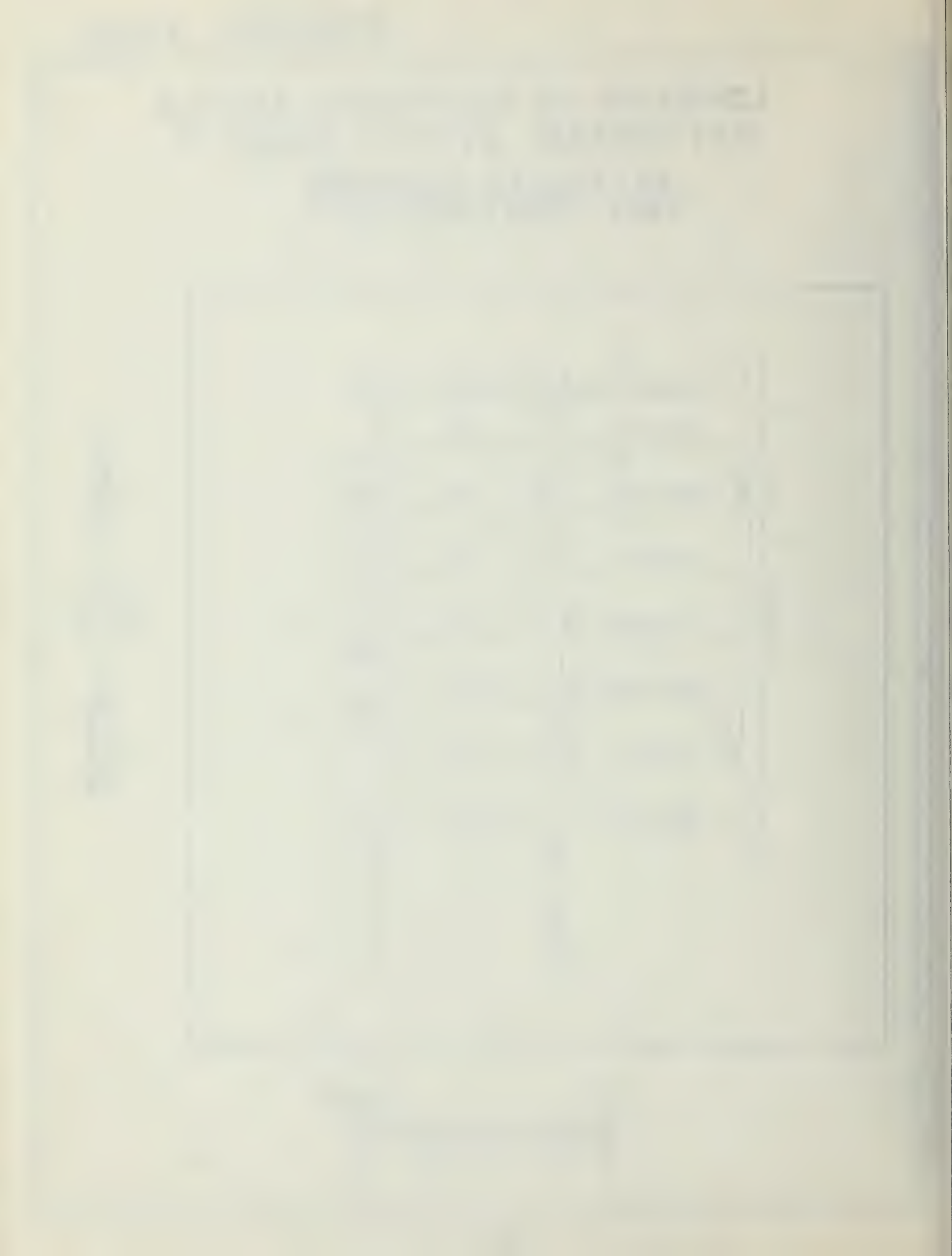
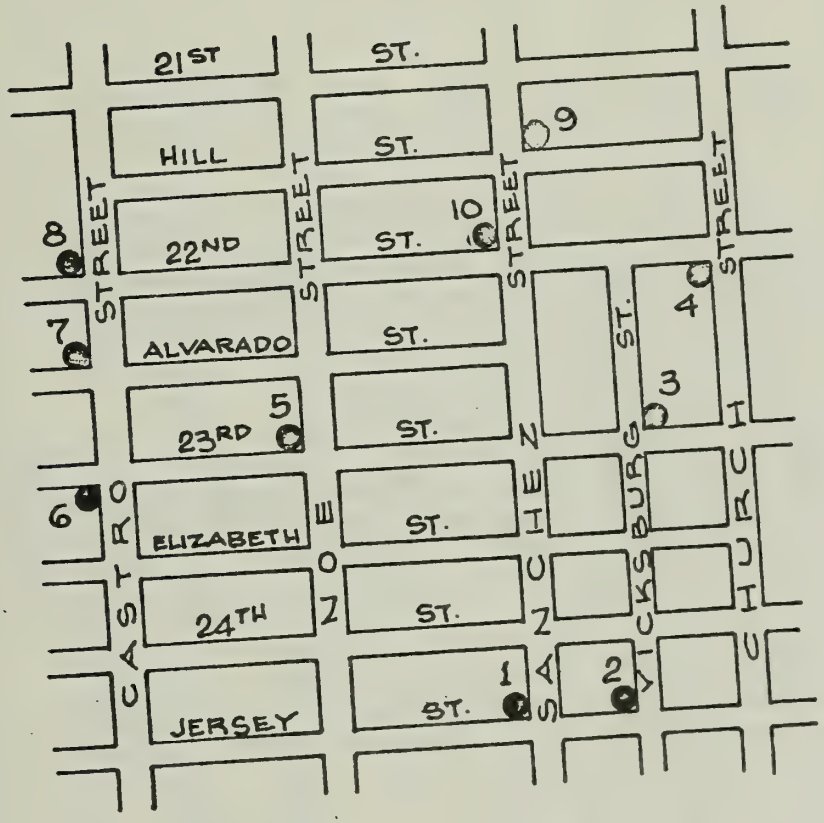


FIGURE V-37

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

UPPER MISSION

AREA IDENTIFICATION



0' 1200'

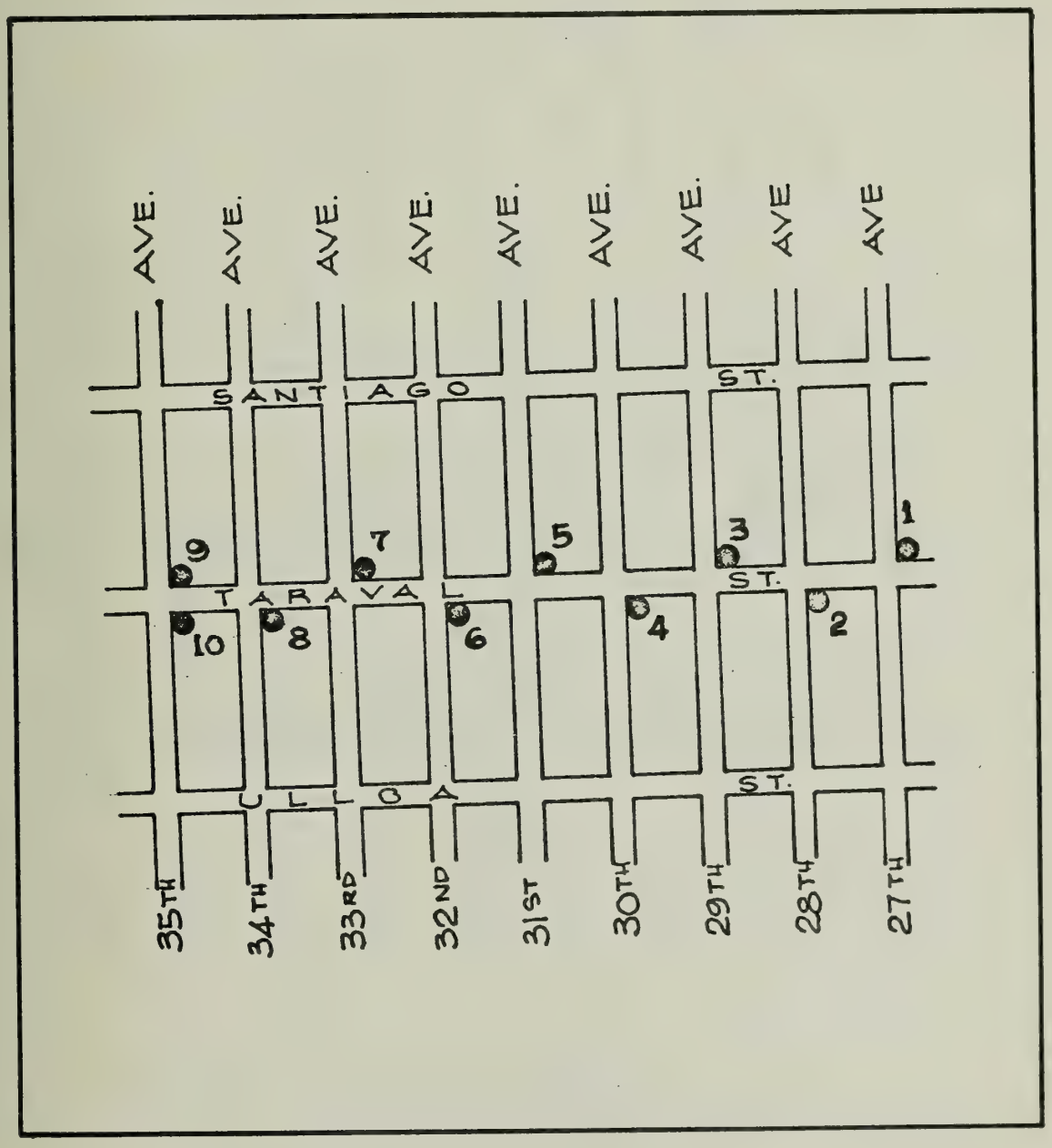
SCALE

FIGURE V-38

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

32ND & TARAVAL

AREA IDENTIFICATION



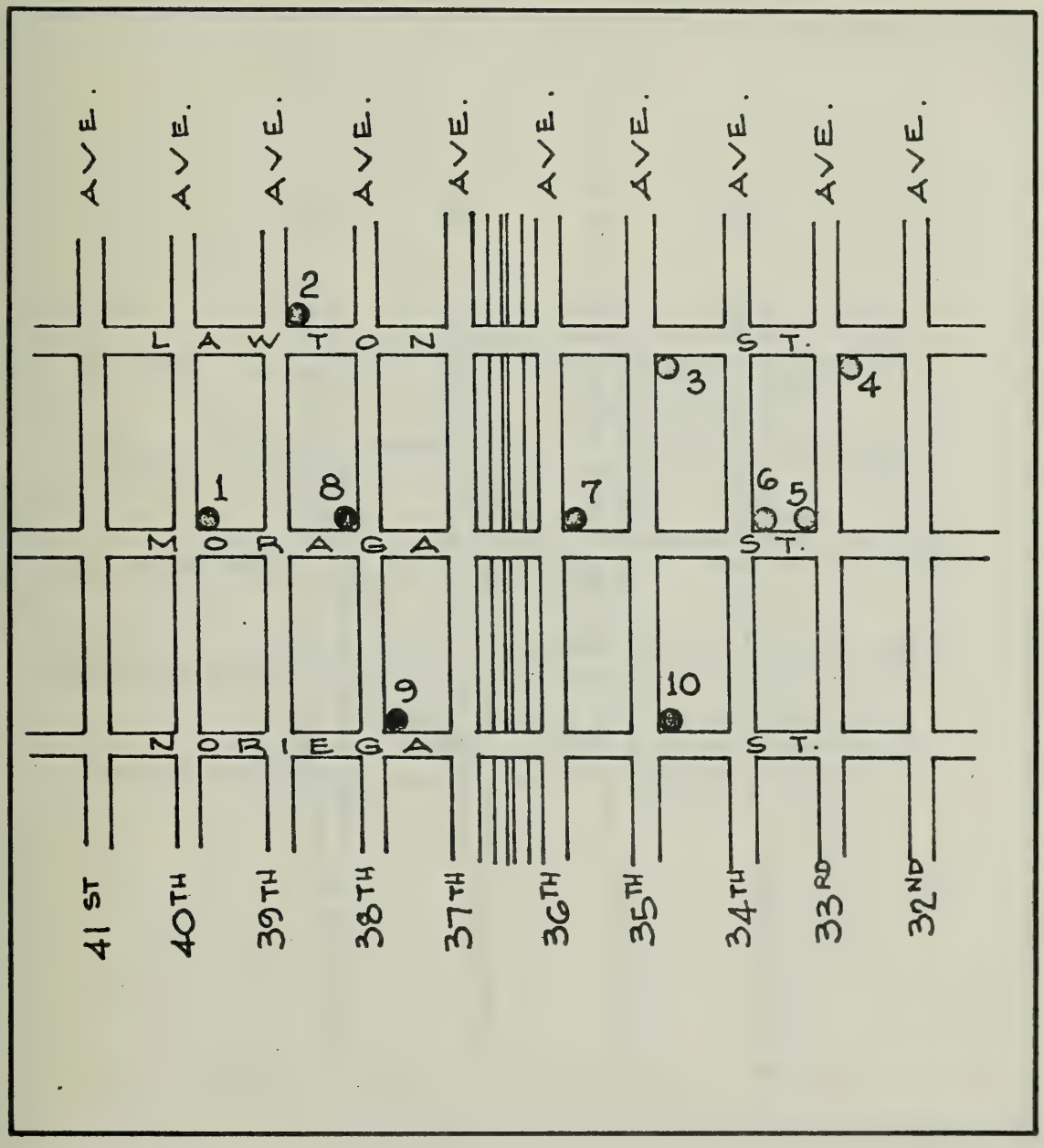
0' 1200'

S C A L E

FIGURE V-39

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

40TH & MORAGA
AREA IDENTIFICATION



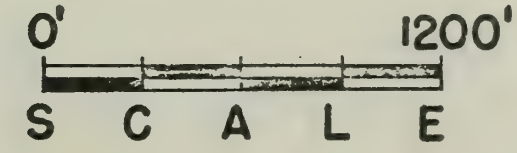


FIGURE V-40

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

WEBSTER & TURK

AREA IDENTIFICATION

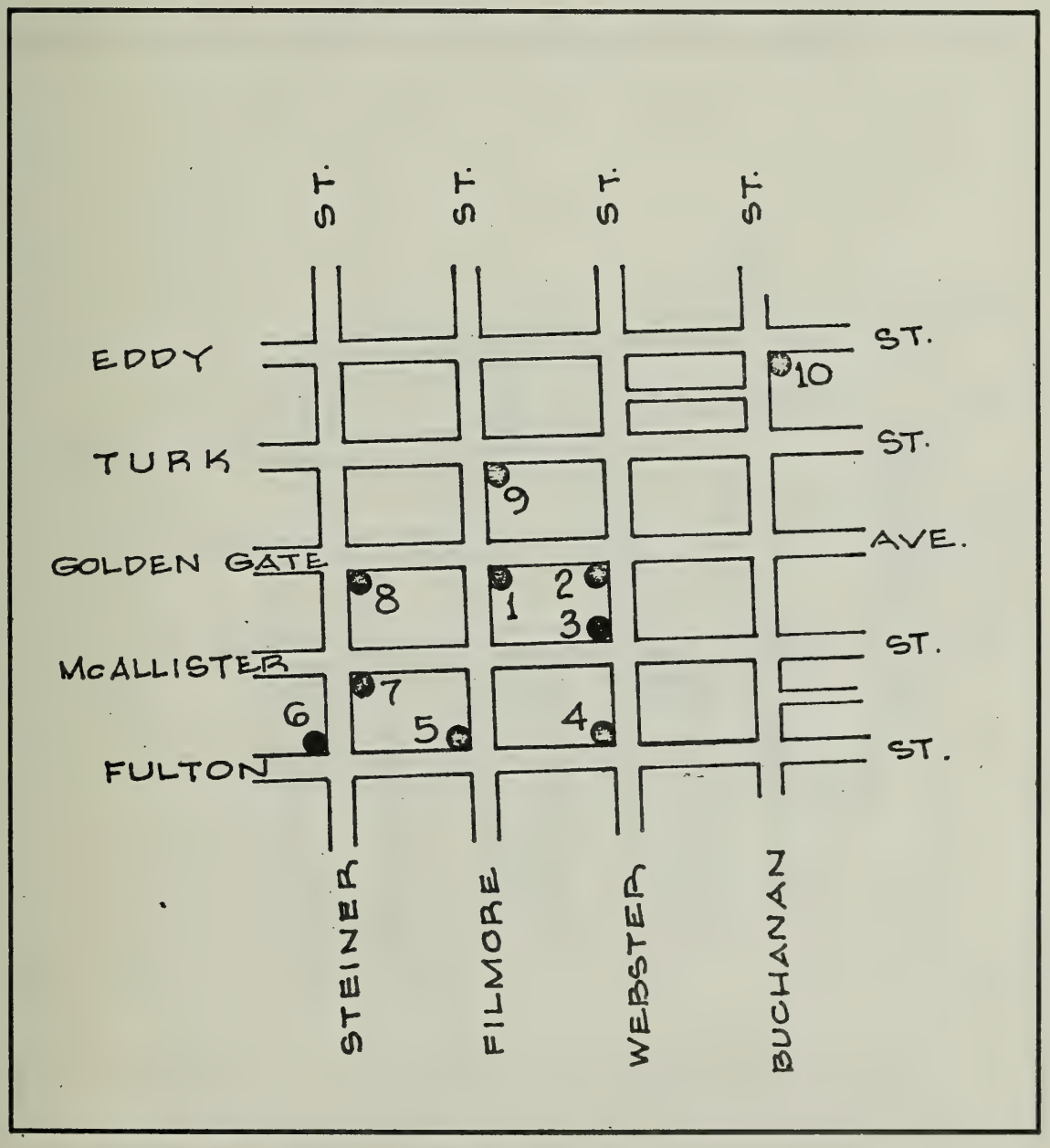
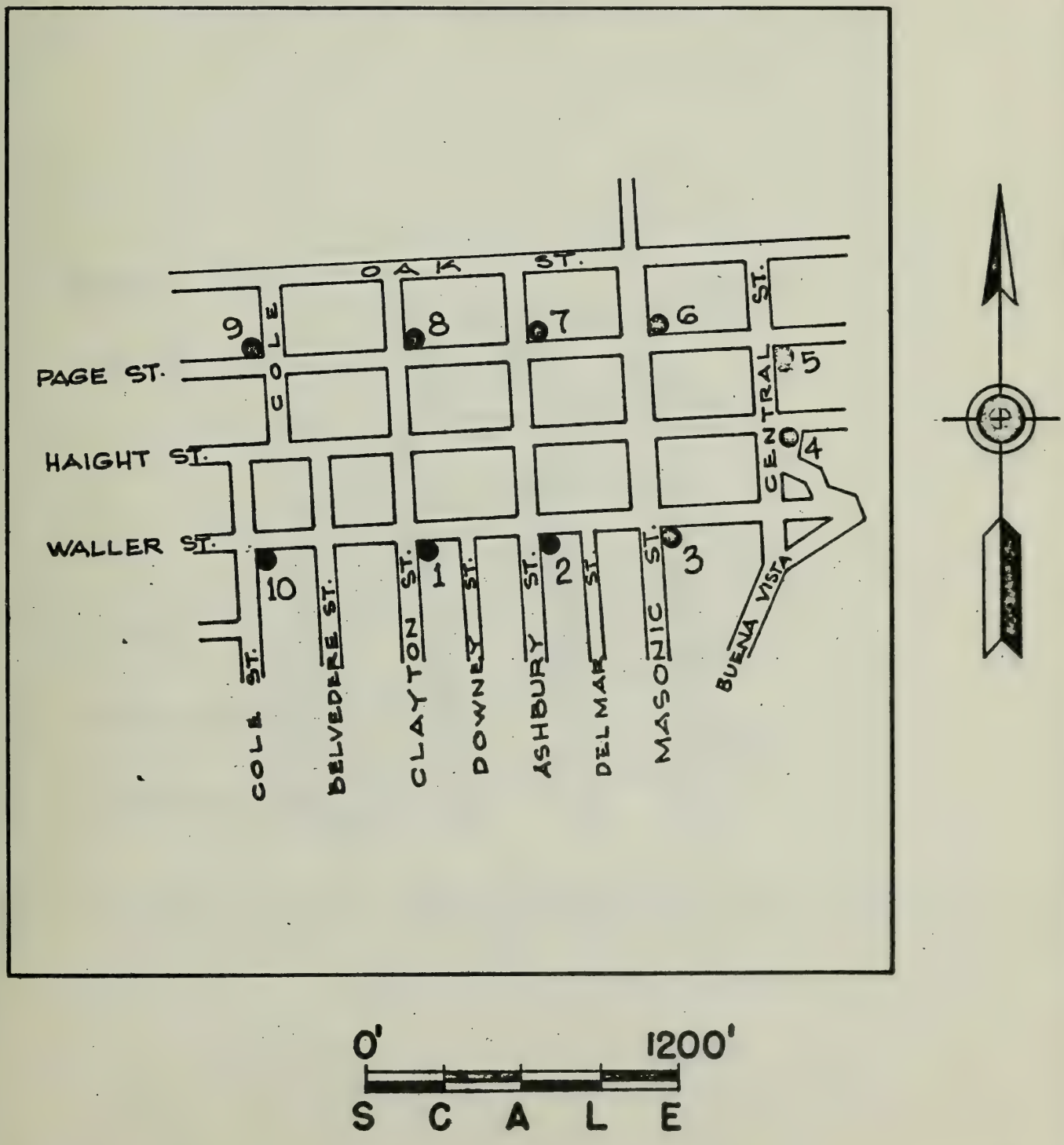


FIGURE V-41

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

HAIGHT

AREA IDENTIFICATION



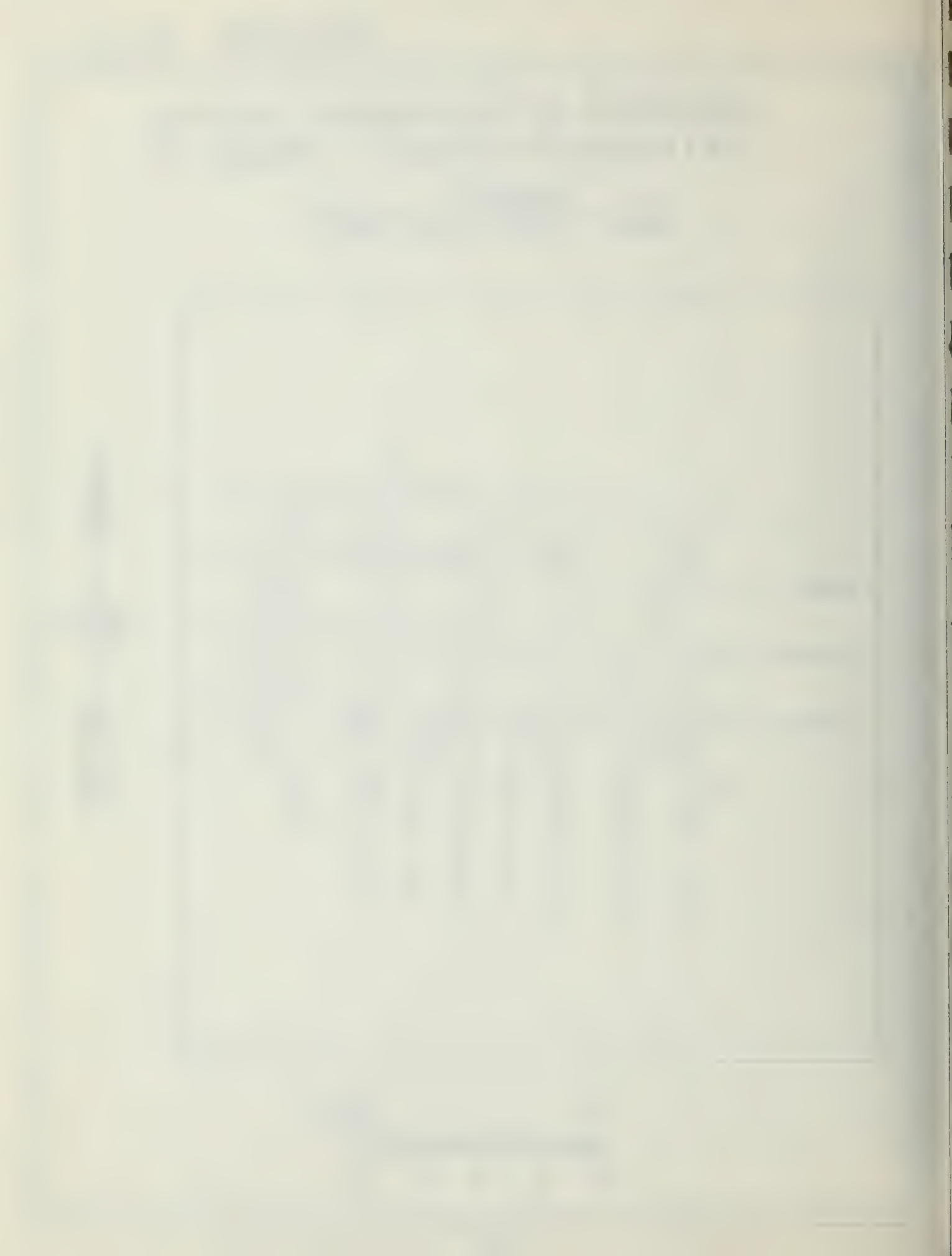
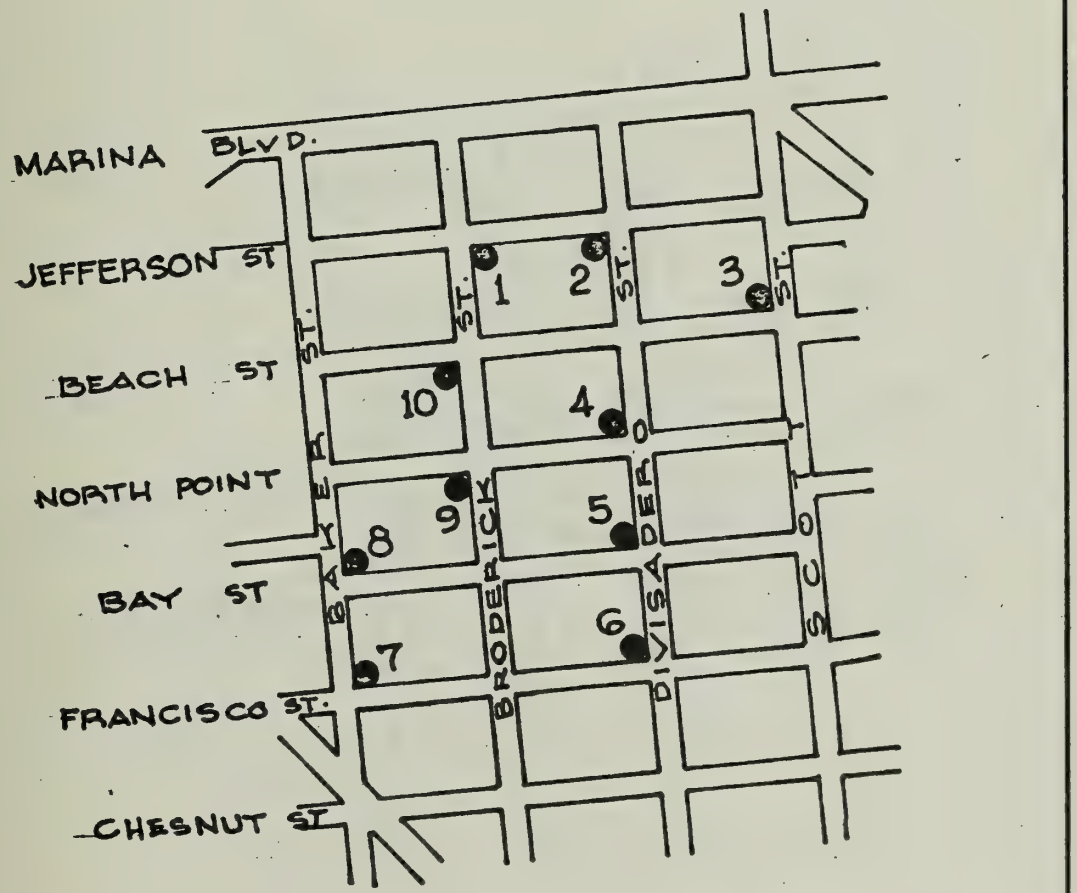


FIGURE V-42

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

MARINA

AREA IDENTIFICATION



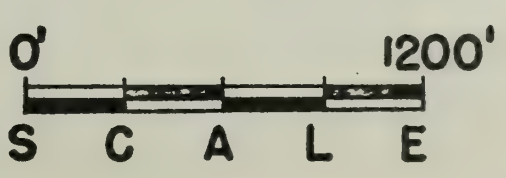
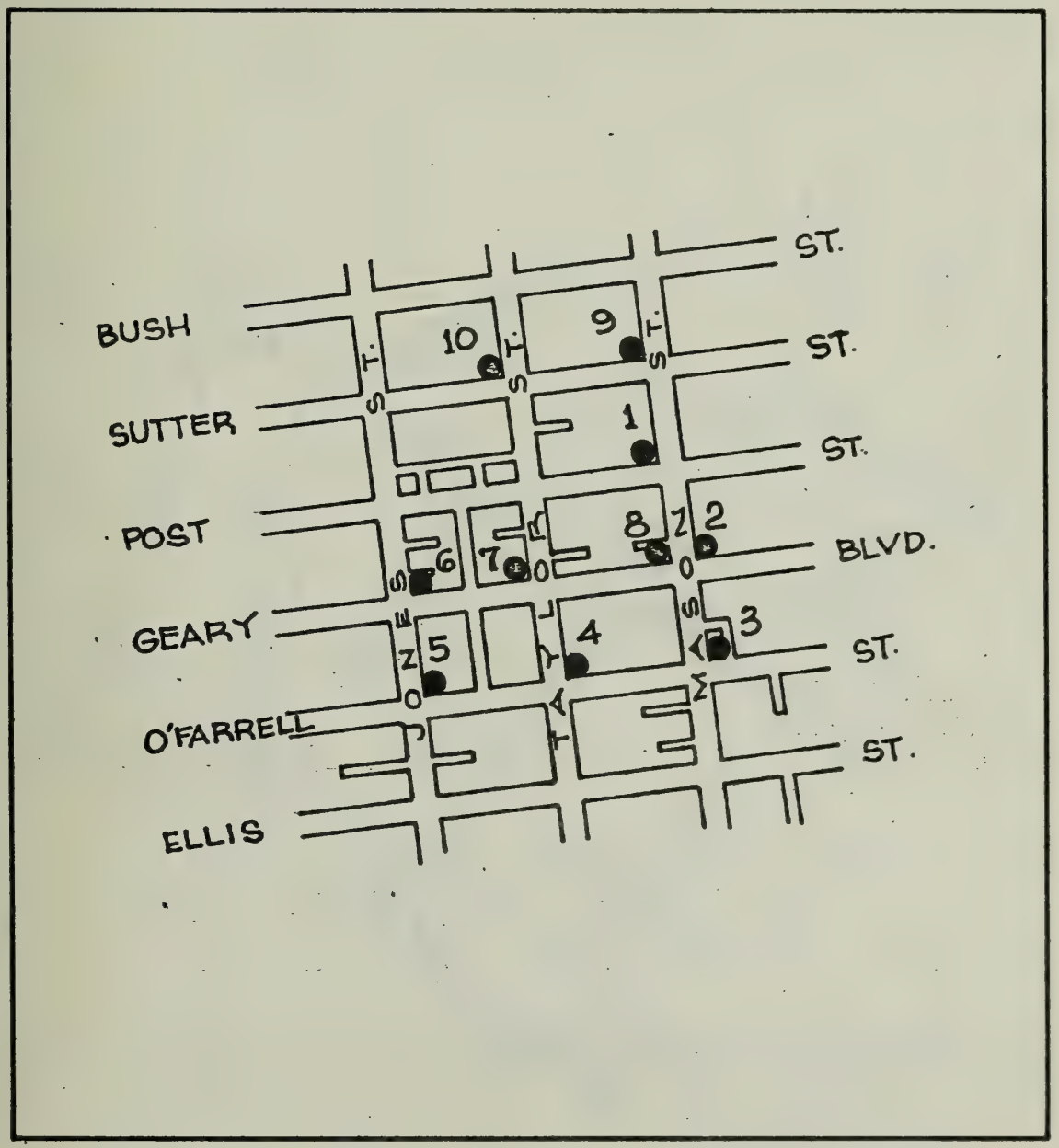


FIGURE V-43

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY - PHASE II

MASON

AREA IDENTIFICATION



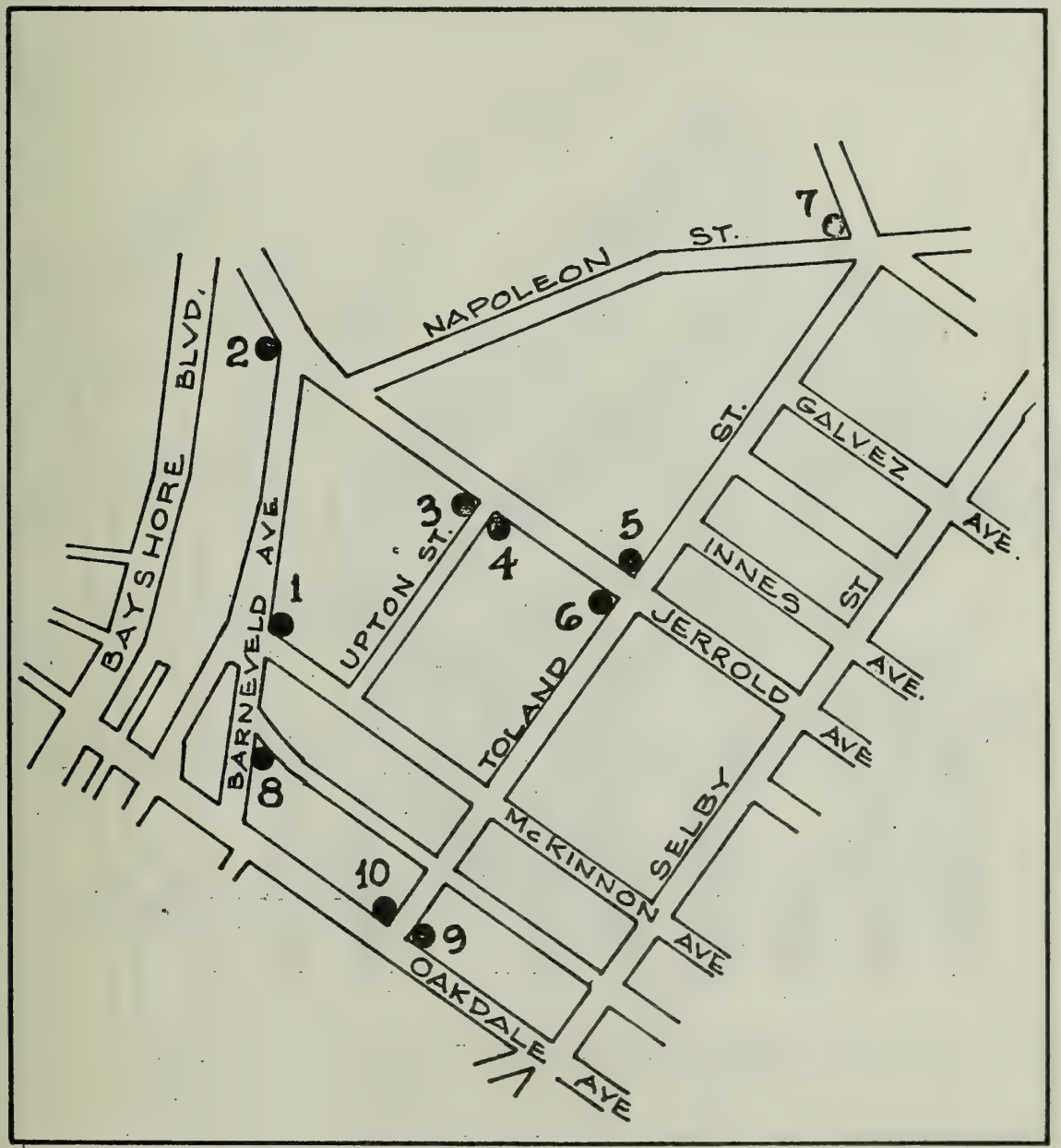
0' 1200'

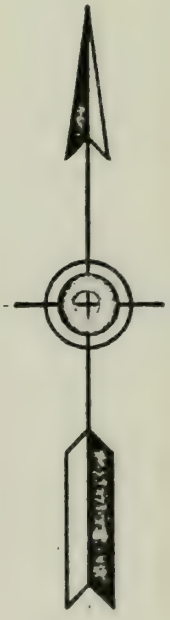
SCALE

FIGURE V-44

LOCATION OF COMPOSITE SAMPLE
CATCHBASIN STUDY - PHASE II

LOWER SELBY
AREA IDENTIFICATION





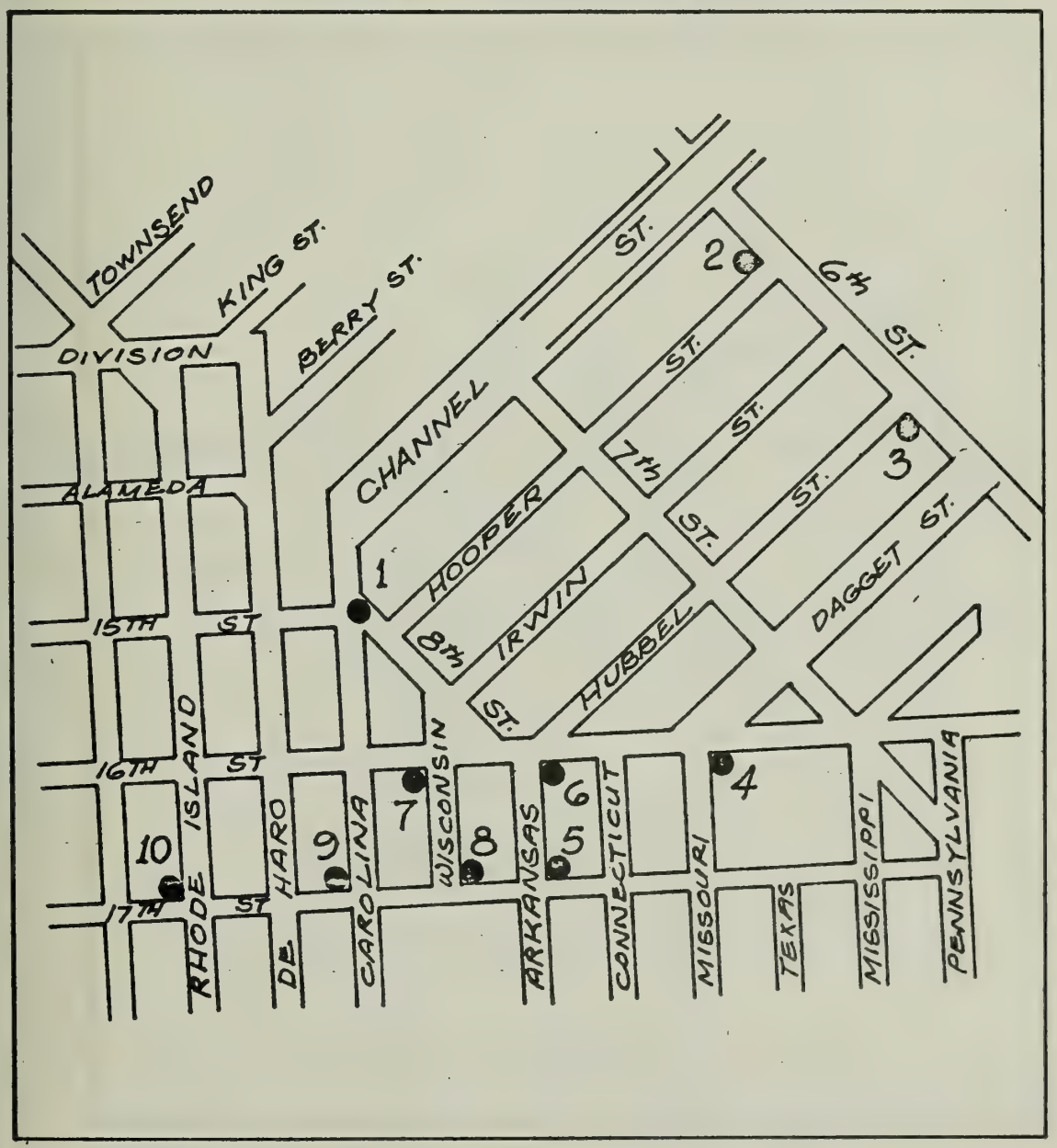
0' 1200'

S C A L E

FIGURE V-45

LOCATION OF COMPOSITE SAMPLE
CATCHBASIN STUDY - PHASE II

7TH & HOOPER
AREA IDENTIFICATION



0' 1200'

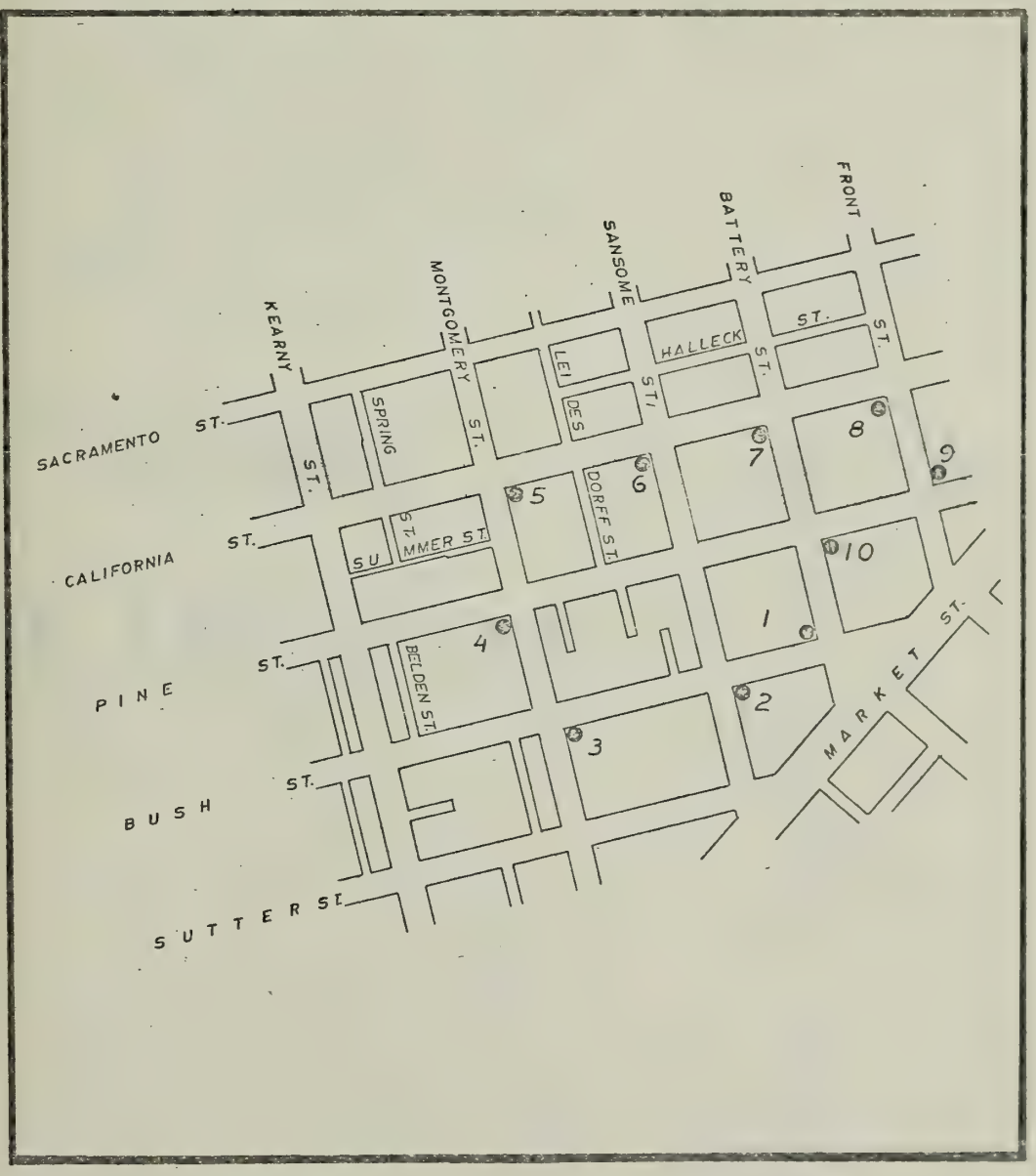
S C A L E

FIGURE V-46

LOCATION OF COMPOSITE SAMPLE CATCHBASIN STUDY — PHASE II

MONTGOMERY

AREA IDENTIFICATION



0 1200'

S C A L E

ESTIMATING

THE FACILITIES

ESTIMATING THE FACILITIES

General

One of the most important factors that must be considered in the selection of any master plan, is the cost of the plan.

In order to develop realistic cost figures for the various components of the envisioned plans, it was decided to engage consultants with an expertise, not only in estimation of facilities, but also in the construction thereof. This was done to insure estimates that would consider the latest construction techniques and costs for the many and varied field conditions existing in San Francisco.

The major facilities in the proposed plans can be classified into five categories. They are:

(a) Retention basins

(b) Pipe conduits

(c) Treatment

(d) Tunnels

(e) Pump Stations

Each of these components must be estimated with consideration given to location in the City and governing construction conditions such as geology, topography and water table.

In order that plans be evaluated on a comparative and realistic basis, it was decided that all estimates would be made on the base of 1974 dollars. Each of the Consultants retained was asked to estimate facilities on the basis of 1974 dollars or provide 1971 figures and a cost escalation factor to be applied to them. A description of the development of the cost for each of the categories is appropriate.

Retention Basins

As rainfall rates and volumes were examined, it became obvious that storage would be utilized in all plans to the most economically managed wet weather overflow. Since the basins could be constructed in a variety of locations and to a multitude of shapes, basic unit prices would be desirable for purposes of estimation. The end result desired would be a set of curves describing the relationship of cost per cubic foot of volume versus volume. The method to obtain the desired generalized curves was manifold in rating progressing generally as follows.

Estimates for each basin in a series of proposed and varied locations throughout the City would be obtained from an estimation engineer with many years of experience

in heavy construction in San Francisco. Unit prices, which would be for a variety of sizes, shapes and locations, would be extracted from the estimates. The extracted unit prices would then be used to estimate additional basins of different sizes and shapes in geologically similar locations. After estimates were made on additional basins, costs per unit of volume were obtained for two categories: Basins in the low-filled areas where there was a water problem, and basins in upstream areas. Best fit curves were obtained by the use of the computer for the various unit volume prices.

The consultant reviewed schematic drawings and made a field examination of each tentative site and based upon his many years experience, developed an estimate for each basin. Included in the estimate were details covering the construction method, and the shoring and bracing required. The type of material to be encountered was considered as was the necessity for demolition, dewatering and the use of tremie concrete to prevent flotation.

Included in the pricing were estimates for the particular type of bulkhead needed, the quantity of excavation and the disposal of same, the need for piles for support, the

quantity of concrete involved including estimates of top and bottom thickness as well as the thickness of exterior and interior walls. Additional factors included were such as pavement excavation and replacement, the removal and replacement of muni or railroad tracks and the necessary flagmen. The detail was carried into the necessary formwork.

The unit prices were extracted from these estimates which, according to the consultant, were good for 1971, and the costing of other basins proceeded. After a substantial number of basins were estimated, the cost was determined for each and escalated to 1974 prices by 7½ percent per year. Utilizing the computer system, the best fit curves shown as Figure V-56 were developed as the end result and the basis for estimating retention basins.

Pipe Conduits

Each of the proposed plans involved the construction of pipe conduits to transport flow. The unit price for this work was developed with the aid of the same consultant engaged for the retention basins. One of the studies involved in the overall master planning was an evaluation of the hydraulic adequacy of the sewer transport system. Tabulations of various required auxiliary or replacement

sewers were sent to the consultant requesting that he develop cost estimates for the work. This was done, again giving consideration to the geology of each location. Unit prices were supplied for excavation, hauling and disposing of material, imported material for backfill as necessary, piles, concrete cradle, rock base, pavement breaking and replacement, manholes, Y's, trench support per foot of depth, and pipe costs. The unit prices supplied were deemed by the consultant to be good for 1974 base estimates. Table V-70 was developed for the project cost per foot of sewer to be installed at the various depths and conditions noted. The project cost was derived as follows: The sum of the individual items was obtained as shown on the sample sheet (Table V-71). The sum was increased by 25% to include the contractor's overhead and profit. This figure was then increased by 30% to include contract contingencies, possible extras, and engineering.

Treatment

The cost graph for treatment shown on Figure V-53 was developed using the basic information for the concrete and earthwork figures from the basic unit prices developed

for the retention basins and adding mechanical and electrical estimates for the required equipment.

The cost figures are for individual unit processes with the exception of primary treatment which was developed for a complete plant, including solids handling. The data from each source was converted to a common basis, if possible, based on parameters such as overflow rates, application rate or regeneration loss to attain equivalent size comparisons. The cost for each equivalent size was updated to an Engineering News Record (ENR) Construction Cost Index of 1700 and then escalated by 7½/year to 1974 costs. The 1700 level is expected to be attained in San Francisco during 1971, as the construction costs index in May 1971 was 1687.

To attain the cost of a secondary treatment stage beyond primary treatment the cost of each process must be added to the primary treatment cost to reach the secondary treatment level. The costs of solids treatment would have to be added to dissolved air filtration process and to the coagulation sedimentation process if they are to be used as primary treatment processes.

Tunnels

Because tunnels will provide the major transport media for the large masses of flow and because the San Francisco geology is varied and semi-unique, it was decided to retain a consultant to develop cost estimates. The consultant chosen has over 30 years experience in the supervision and estimating of heavy construction projects, especially underground facilities.

The consultant was asked to provide specific cost estimates for tunnels in various areas of the City as shown schematically on a map of the City. Underground geologic information was provided from a series of well log data developed for old water wells throughout the City. Also provided was a map showing the fault zones in San Francisco as prepared for the City in a previous report.[1] The consultant prepared the estimates in the same manner as for a contract bid price utilizing 1971 dollars and a 7½ percent per year escalation factor.

It was considered that there were seven basic formations and invironments that must be considered when tunneling.

A. Sandstone

B. Sand, common and sandstone

---

1) Bechtel, 1970 Prefeasibility Study, Sewer Tunnel Project.

C. Chert, basalt, and serpentized peridotite

D. Sandstone, fault zone

E. Sand

F. Chert, basalt, serpentized peridotite, fault zone

G. Fill areas, under air pressure

The estimates were made considering the total direct costs, plant and equipment and indirect costs for tunneling.

In order that other alignments could be estimated, the consultant developed unit prices for tunneling for various diameter tunnels from 5' to 35' through the seven various environments. These unit prices developed were based on 1971 prices. The unit prices were escalated to 1974 by a factor of 7½ percent per year. Again utilizing the computer, best fit curves were developed showing a correlation coefficient between 98% and 99.7%.

The consultant advised that because of set up costs for tunneling that the unit prices given would be adequate for tunnels over 5,000 feet in length. It was decided that to cover such charges, the unit prices should be increased by 10% for each 1,000 feet less than the 5,000. A minimum length of tunnel of 1,000 feet was also established.

The estimating curves are shown as Figure V-54.

Pump Stations

Pump stations are the last major item included in the various alternatives. Costs were developed by the City in 1970 for a flow range of 40 CFS to 500 CFS at total design head (TDH) from 30 to 300 feet.

The cost reflected current project costs of a building at or near ground level, pumps, motor drivers and auxiliary equipment. They would not include cost of providing electrical power to the building.

The influent to the pumps was assumed to be the quality of combined sanitary sewage, thus limiting the choice of pumps to the sewage type which is generally not available for high head applications. The costs assume single stage pumps up to 150 feet TDH; above 150 feet single or two stage series pumping was used. Spare units were included at 25% of operating units. Figure V-55 illustrates the developed costs escalated to 1974 by a factor of 7½ percent per year.

CONDUIT PROJECT COST

(N) Normal Installation-reuse material
(IB) Imported Backfill
(P) On Piles

1974 BASE DOLLAR
ADD 7½% ESCALATION EACH YEAR THEREAFTER

SIZE * On Cradle	DEPTH 5' N	5' IB	5' P	6' N	6' IB	6' P	N	IB	P	N	IB	P	N	IB	P
12"	104	110	216	105	113	218									
15"				117	128	234									
18"				121	133	238									
21"				125	137	242									
*24"				176	190	255									

TABLE V-70

CONDUIT PROJECT COST

(N) Normal Installation-reuse material
(IB) Imported Backfill
(P) On Piles

1974 BASE DOLLAR
ADD 7½% ESCALATION EACH YEAR THEREAFTER

SIZE * On Cradle	DEPTH 7'			8'			9'			10'			11'		
	N	IB	P	N	IB	P	N	IB	P	N	IB	P	N	IB	P
12"	106	116	221	108	118	224									
15"	119	133	238	121	137	243									
18"	123	137	243	125	141	247									
21"	127	141	247	130	145	251									
*24"	179	194	259	181	199	264	184	204	269	186	209	274			
*27"	184	199	264	186	204	269	188	209	274	191	214	279			
*30"	191	206	271	194	211	276	196	216	281	198	221	286			
*33	205	223	288	208	228	293	211	234	299	214	240	305			
*36"				218	237	315	220	243	321	223	248	326			
39"				168	187	306	170	193	311	173	198	317			
42"				176	196	322	179	202	328	182	208	334			
45"				186	207	333	189	213	340	192	219	345			
48"				191	211	372	194	218	378	197	224	384			
51"							198	221	381	201	227	389	204	234	394
54"							201	223	384	204	230	390	207	236	396
57"							214	239	399	218	246	406	221	253	413
60"										226	254	415	230	261	422
63"										236	264	457	240	271	464
66"										246	274	467	250	281	474
69"										259	288	496	263	296	504
72"										272	304	538	277	313	547
75"										291	319	553	295	328	562
78"													312	344	593
81"													322	353	602

TABLE V-70

CONDUIT PROJECT COST

(N) Normal Installation-reuse material
(IB) Imported Backfill
(P) On Piles

1974 BASE DOLLAR
ADD 7½% ESCALATION
EACH YEAR THEREAFTER

SIZE * On Cradle	DEPTH 12' N	12' IB	12' P	13' N	13' IB	13' P	14' N	14' IB	14' P	15' N	15' IB	15' P	N	IB	P
60"	233	268	429												
63"	243	277	471												
66"	253	288	481												
69"	266	303	511	270	311	519									
72"	281	321	555.	285	329	563									
75"	299	336	570	303	345	579									
78"	316	352	601	320	361	609	330	376	624						
81"	326	362	610	330	370	619	341	385	634						
84"	335	369	618	339	378	626	350	393	641	357	404	653			
87"				360	403	674	371	418	689	379	431	701			
90"				379	418	688	390	433	704	397	446	717			
93"				396	434	704	407	449	720	415	462	732			
96"				431	467	738	442	483	753	450	495	766			
102"				504	542	835	515	558	851	523	571	864			

WORK SHEET

Pipe Diameter 27"

Depth of Sewer 9'

(A) all sewers 24" - 36" diam. shall be on cradle with rock base

Normal	Imported Backfill	Piles ✓		
			YD^3 Excavation	2.34
			Pile Space	6.00
			Cradle YD^3 Concrete	0.25
X			Normal Job (Cost haul & Dispose of material (col. 7)	
	X	X	Pile Job (Imported backfill Job) Cost to haul & dispose of Material (Col. 3)	9.36
	X	X	Cost imported backfill @ $2/yd (Col. 6)	4.38
		X	Pile Cost/ft. (Col. 9)	40.00
A	A	X	Cost Cradle all sewers 24"-36" (Col. 11)	22.50
A	A	X	Rock base all sewers 24"-36" (Col. 12)	2.50
X	X	X	Pavement Break & Replace (Col. 13)	6.72
X	X	X	Manhole Cost (Col. 14)	2.20
			Stull Trench (Col. 15)	
			Excavation for Stull Trench (Col. 16)	
X	X	X	Sheet Trench (Col. 17)	46.00
X	X	X	Excavation for Sheet Trench (Col. 18)	13.10
X	X	X	Pipe Cost (Col. 19)	21.75

Sum	165.51
S = Profile & OH x 1.25	210.64
Engineering 1.3 S	273.83
USE	$ 274.00

FIGURE V-53

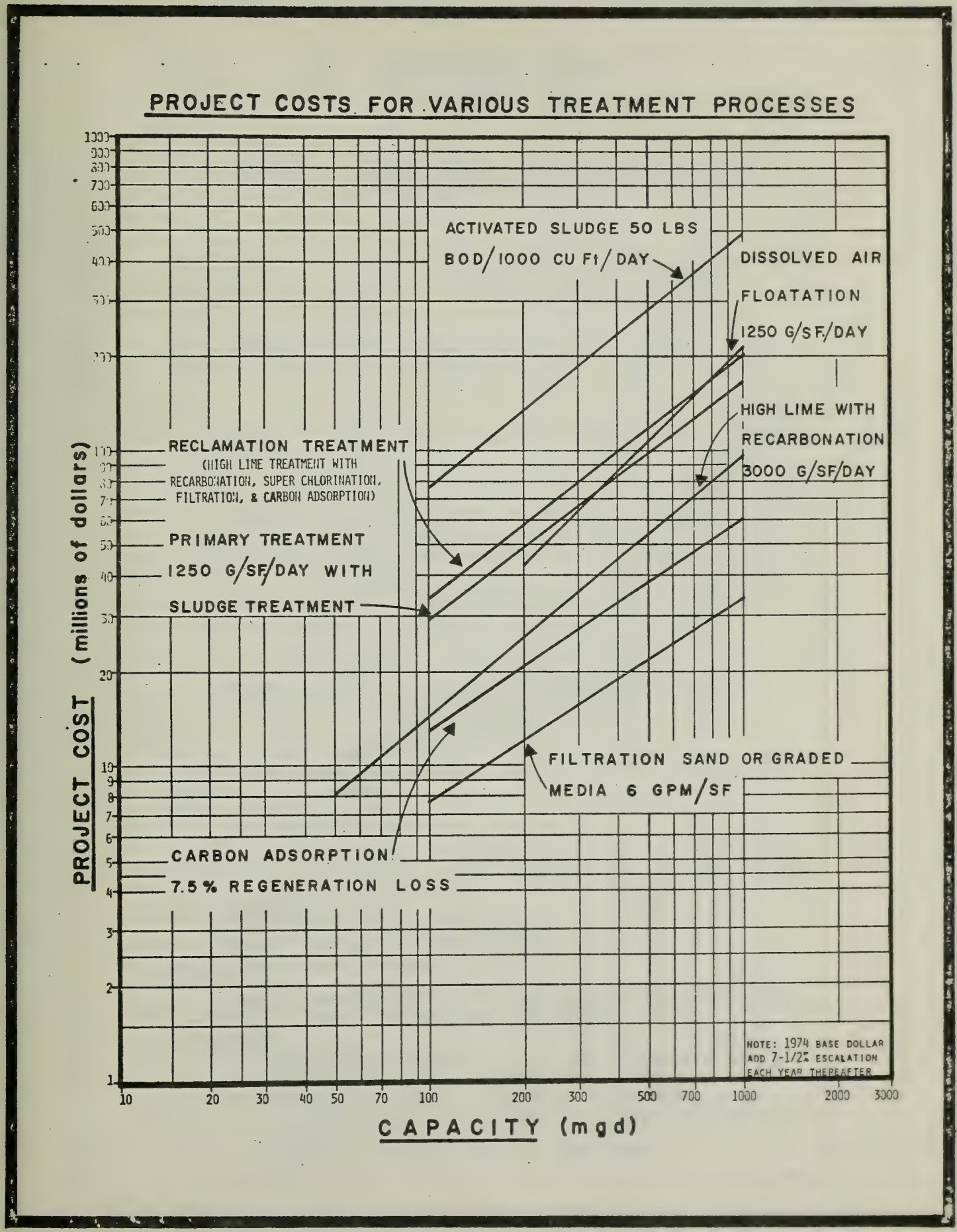
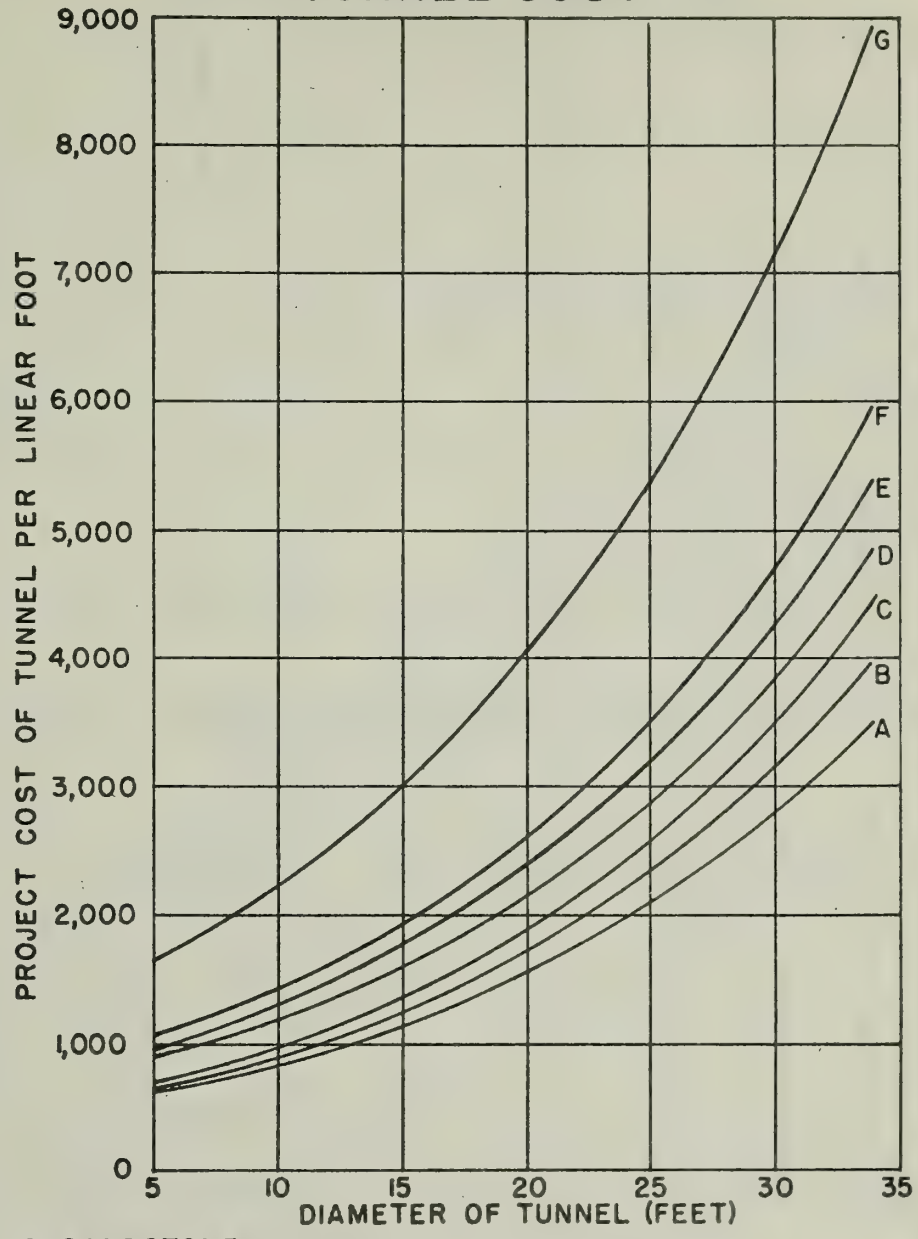

PROJECT COSTS FOR VARIOUS TREATMENT PROCESSES
ACTIVATED SLUDGE 50 LBS BOD/1000 CU Ft/DAY
DISSOLVED AIR FLOATATION 1250 G/SF/DAY
HIGH LIME WITH RECARBONATION 3000 G/SF/DAY
RECLAMATION TREATMENT (HIGH LIME TREATMENT WITH RECARBONATION, SUPER CHLORINATION, FILTRATION, & CARBON ADSORPTION)
PRIMARY TREATMENT 1250 G/SF/DAY WITH SLUDGE TREATMENT
FILTRATION SAND OR GRADED MEDIA 6 GPM/SF
CARBON ADSORPTION 7.5% REGENERATION LOSS
NOTE: 1974 BASE DOLLAR ADD 7-1/2% ESCALATION EACH YEAR THEREAFTER
PROJECT COST (millions of dollars)
CAPACITY (mgd)
10 20 30 40 50 70 100 200 300 500 700 1000 2000 3000
1 2 3 4 5 6 7 8 9 10 20 30 40 50 70 100 200 300 400 500 600 700 800 900 1000

FIGURE V-54



A. SANDSTONE
B. SAND, COMMON & SANDSTONE
C. CHERT, BASALT, SERPENTIZED PERIDOTITE
D. SANDSTONE, FAULT ZONE
E. SAND
F. CHERT, BASALT, SERPENTIZED PERIDOTITE, FAULT ZONE
G. FILL AREAS UNDER AIR PRESSURE

NOTES:

1. COSTS ARE 1974 BASE DOLLAR. ESCALATE 7½ % PER YEAR, EACH YEAR THEREAFTER.
2. PRICES APPLICABLE TO 5,000 FT. TUNNEL. FOR EACH 1,000 FEET LESS, INCREASE UNIT BID PRICE BY 10%.
3. MINIMUM LENGTH TUNNEL 1,000 FEET.

FIGURE V-55

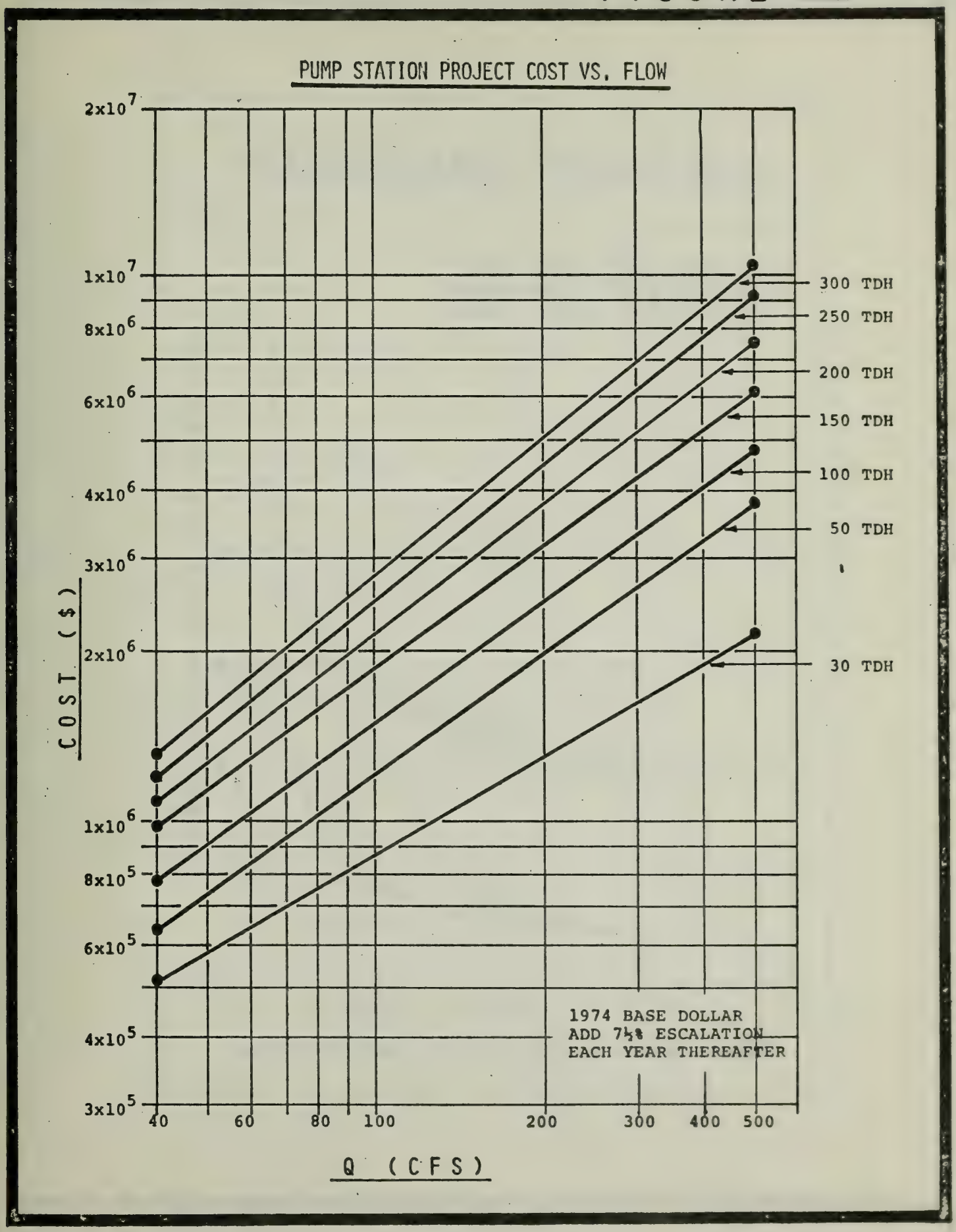
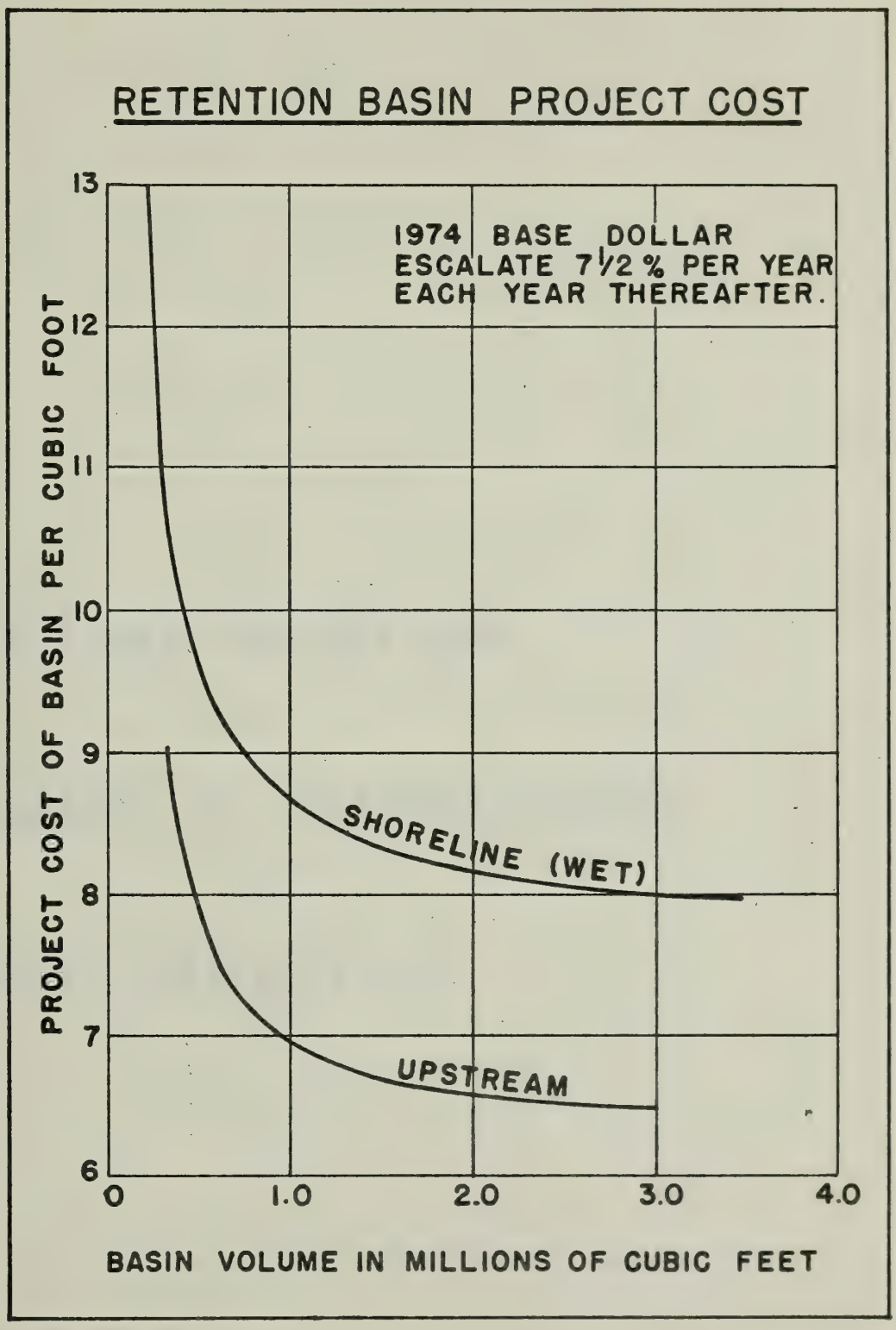

PUMP STATION PROJECT COST VS. FLOW
2x10^7
1x10^7
8x10^6
6x10^6
4x10^6
3x10^6
2x10^6
1x10^6
8x10^5
6x10^5
4x10^5
3x10^5
COST ($)
300 TDH
250 TDH
200 TDH
150 TDH
100 TDH
50 TDH
30 TDH
1974 BASE DOLLAR
ADD 7½% ESCALATION
EACH YEAR THEREAFTER
40
60
80
100
200
300
400
500
Q (CFS)

FIGURE V-56


RETENTION BASIN PROJECT COST
1974 BASE DOLLAR
ESCALATE 7 1/2 % PER YEAR
EACH YEAR THEREAFTER.
SHORELINE (WET)
UPSTREAM
PROJECT COST OF BASIN PER CUBIC FOOT
13
12
11
10
9
8
7
6
0
1.0
2.0
3.0
4.0
BASIN VOLUME IN MILLIONS OF CUBIC FEET

SEWERAGE SYSTEM

DRAINAGE & WATERSHED

CHARACTERISTICS

SAN FRANCISCO SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION AND EMPLOYMENT

To effect a long term sewerage system master plan, the Department of Public Works has undertaken to identify the land usages of each watershed which comprises San Francisco's sewerage system. Information of this composite may then be used to predict sewerage system response to variables such as changes in land usage, population shifts, and other changes that may affect the sewer system function. With knowledge of the projected changes and confidence in the results, cost savings can be gained by incorporation of the appropriate modifications into initial facilities design. Prior to any real predictive use of the information, it will be necessary to determine the degree that land usage affects constituent measurements obtained in the field.

A history table approach is being used as a practical approach to the need for hydraulic control of the system. This is described in Chapter VIII of the Master Plan Report.

In the development of a usable historically based data control reference, present land use distributions with

corresponding housing, population, and employment densities are a necessary base from which future conditions may be measured and predicted. Major studies undertaken by a number of organizations projecting San Franicsco's land use characteristics were utilized for basic data. The Bay Area Simulation Study (BASS IV) was one of these major studies, undertaken as a part of the S. F. Bay-Delta Water Quality Control Program, and its resultant projections are believed to be the best source available. Hence, it was from this particular study that the basic data for the land use/constituent characteristics were derived.

BASS IV's present and projected figures were essentially derived from the 1960 census of San Francisco conducted by the Bureau of Census. While the 1960 census subdivides the entire City into a number of census tracts, BASS IV subdivides the City into a number of demographic areas which are generally larger than the census tracts. Plate II shows the census tract boundaries and Plate III shows the BASS IV demographic area boundaries. The relationship between the demographic areas and the census tracts is tabulated in Plate IV.

The present and projected land use distribution for each demographic area together with its corresponding

housing, population, and employment desnities, from the Bay Area Simulation Study, are tabulated in Plate V. It is important to note that the figures shown in the land use distribution columns are percentage of the gross demographic area. However, the density column figures are tabulated on a "per acre" basis. These figures were converted as described to facilitate the development of the basic data for the separate watersheds as will be shown later.

As to the San Francisco's sewerage system, the entire City is divided into three major sewerage service areas, each of which is served by a primary treatment plant. The location of each of the plants and its outfalls, together with the approximate area it serves is shown on Plate I.

The North Point Water Pollution Control Plant, located on Bay and Kearny Streets, serves an area of approximately 9,300 acres. The composition of this area is predominantly residential in character, but also includes commercial and industrial developments along the Port. The Richmond-Sunset Water Pollution Control Plant, located on the southwest corner of the Golden Gate Park, serves

essentially a residential area of about 10,400 acres. And finally, the Southeast Water Pollution Control Plant, located on Jerrold Avenue near Quint Street, serves a heavily industrialized area of approximately 8800 acres.

In the development of the model of San Francisco's sewerage system, the three major sewerage service areas were subdivided into a number of drainage districts called watersheds. With due consideration to the topographic nature of the area, the watershed boundaries were established through a series of sewer pluggings such that all the transport elements of the sewer system for each watershed flow through a common point. The flow isolation of each watershed was initiated to facilitate field measurement of the transport elements of the system and the subsequent historical reaction of the drainage system to the area. With these purposes in mind, flow monitors were installed all over the City and at suitable strategic locations within the system where flows of one or more watershed may be measured and recorded. These monitors will also provide the basis for the development of the history tables previously noted.

While every effort was exerted to have all the watersheds covered by a flow monitor, there are some vacant lands within the City which do not have any sewers, thereby making

it impossible to monitor the flow. Such watersheds are classified as "non-monitored watersheds" to differentiate them from the majority of the watersheds known as "monitored watersheds".

For practical and easy identification purposes, a watershed numbering system was derived to relate the number of the monitor measuring the flow of the watershed to that watershed. The monitor number, in turn, are related to the number of the outfall where the monitored flow discharges. Plate VII-3 shows a typical portion of the City with a monitor (monitor #220) installed at a common point where the transport elements from four watersheds (watersheds #22280, #22281, #22290, and #22291) flow through. Note that watershed #22280 and #22281 flow through node #28 while watersheds #22290 and #22291 flow through node #29 which is downstream of node #28. Transport elements from all four watersheds flow through a common point measured by monitor #220 and discharged via outfall #22.

With watershed boundaries established throughout the City, the present and projected land use distribution for each watershed with its corresponding housing, population, and employment densities were calculated

utilizing the basic data from the Bay Area Simulation Studies (BASS IV). (A map showing the entire City of San Francisco with all the watersheds and its boundaries is on file at the Division of Sanitary Engineering.) The resultant calculations are summarized and tabulated in Plate VI. Plate VII illustrates the calculation procedure taken in obtaining the figures in Plate VI.

The basic information developed on land usage will be coupled in the future with data on the constituent characteristics of the flows derived from the watersheds. The flow constituents will be identified as to source including surface runoff, catchbasin emissions, sewer system scouring and sanitary flow emissions. A general approach to this facet of the problem has been previously described in the sections on mass emission coefficients and catchbasin monitoring. With the completion of these efforts in the near future, sufficient correlation should be available to allow predictive capabilities to relate quality and quantity to land use characteristics and changes thereof.

LOCATION OF TREATMENT PLANTS, THEIR OUTFALLS, & SERVICE AREA

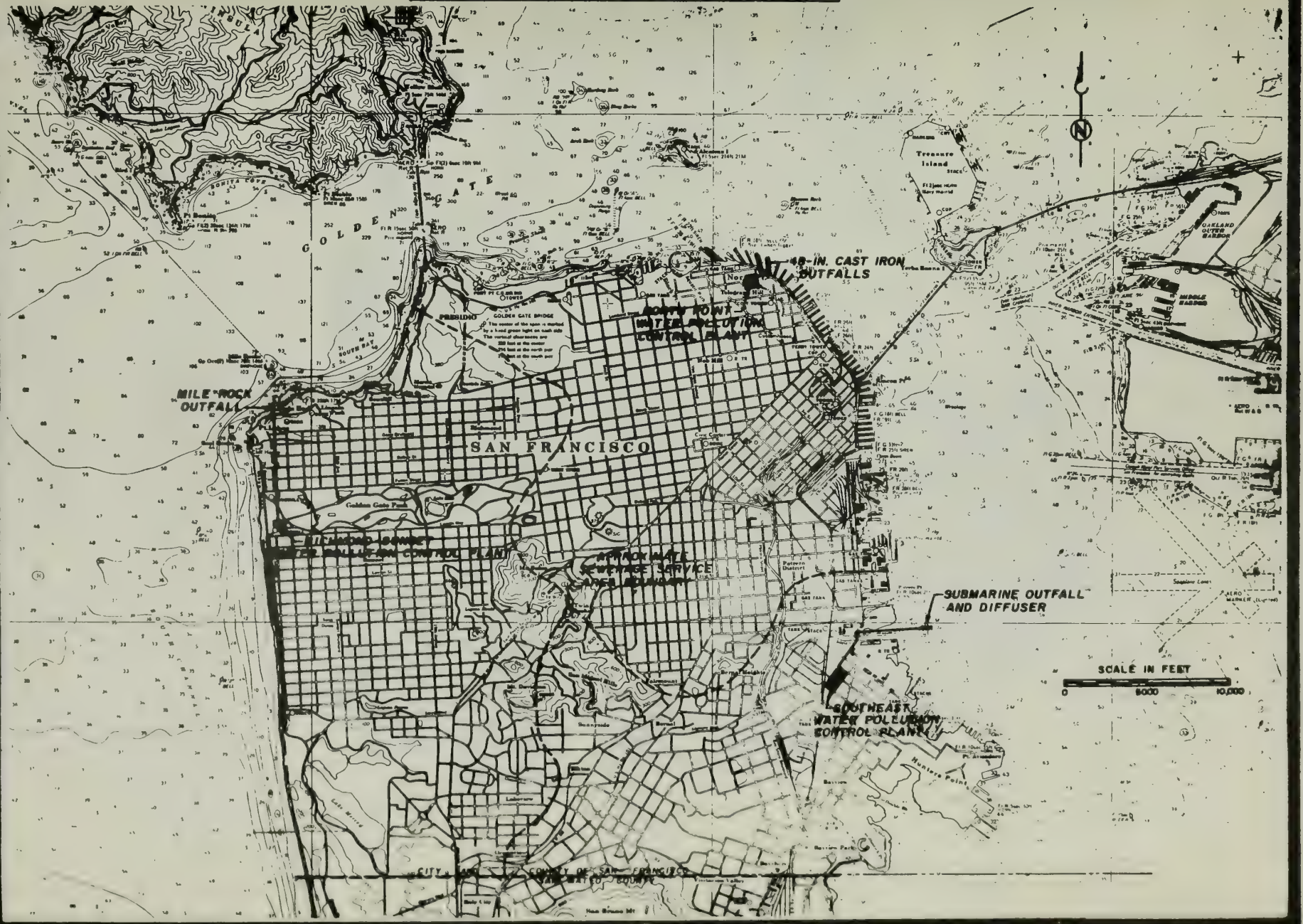


PLATE I

PLATE II

1960 CENSUS TRACTS

PREPARED BY THE SAN FRANCISCO DEPARTMENT OF CITY PLANNING · 1964

PLATE III

BASS IV's DEMOGRAPHIC AREAS

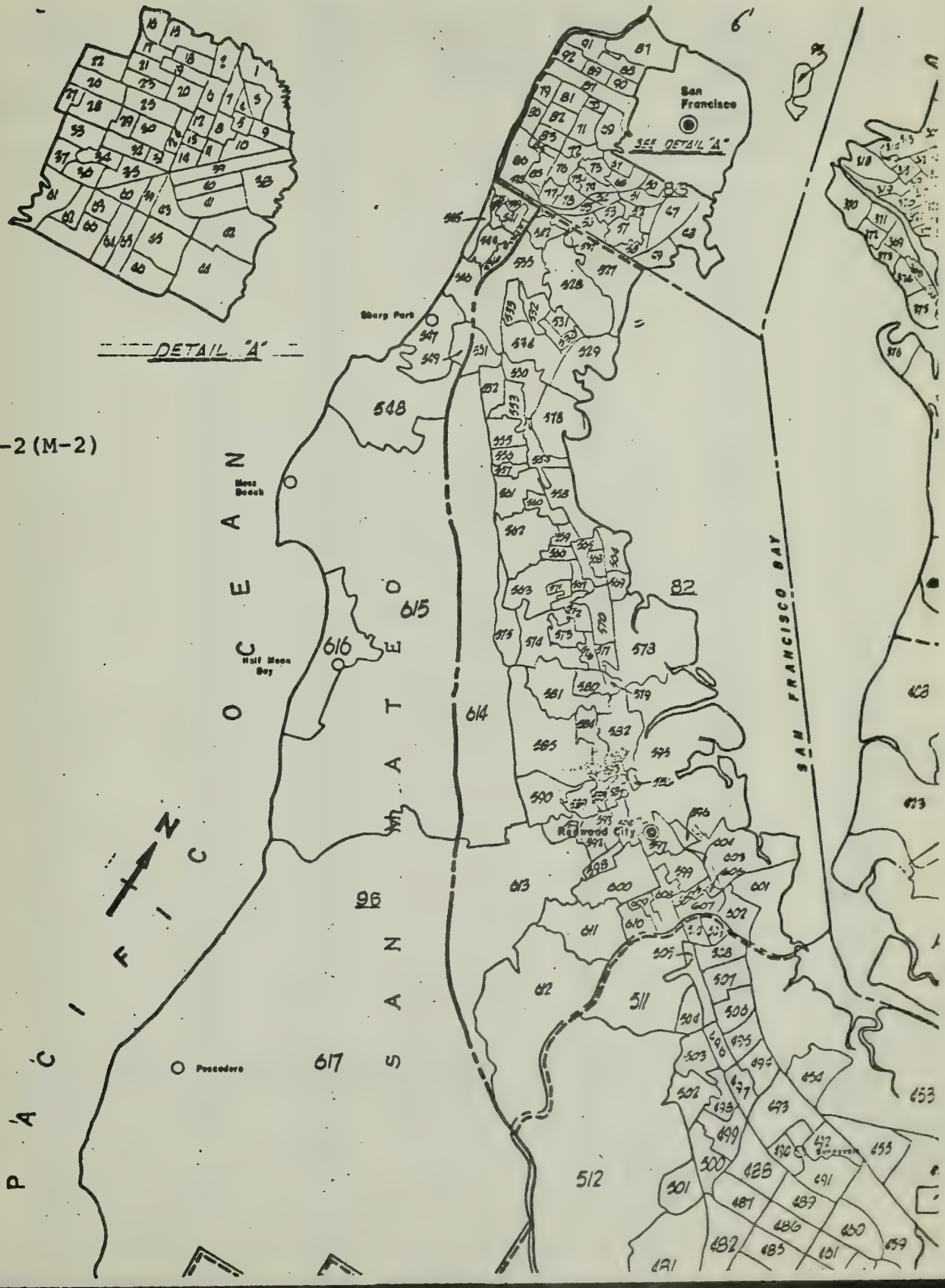


PLATE IV

BASS III AREA CODING (TRACT BASIS)

BASS III SUBAREA	1960 CENSUS TRACT
SAN FRANCISCO COUNTY	
1	A1
2	A2
3	A4
	A5
4	A6
5	A13
	A14
	A15
6	A8
	A9
7	A3
	A7
8	A11
	A12
	A18
9	A16
10	A17
11	A21
	A22
12	A10
	A19
13	A20
14	A23
15	B1
16	B2
17	B3
18	B4
19	B5
20	B6
21	B7
22	B8
23	B9
	B10
24	J1
	J9
25	J2
	J3
	J6
26	J4
27	J5A
28	J5B
29	J7
30	J8
	J10
31	J11
32	J12
	J13
33	J14
	J15
34	J16
35	J17
	J18
36	J19
37	J20
38	K1 50%
39	K2
40	K3
41	K4
42	K5
43	K6
44	L1
45	L2
46	L3
47	L4
48	L5A
49	L5B
50	M2
	M3
51	M1
	M4
52	M5B
	M5A
53	M6
54	M7
55	M8
56	M9
57	M10
58	M11
59	N1
60	N2
	N3
61	N4
62	N5A
	N5B
63	N6
64	N7
	N10
65	N8
	N9
66	N11
	N12
67	N13
68	N14
	N15
69	01
70	02
71	03
72	04
73	05A
74	05B
75	06
76	07
77	08A
78	08B
	09
79	Q1A
80	Q1B
81	P1
82	P2
83	P3A
84	P3B
85	P3C
86	R1
87	C1
	11
88	D1
	D2
	E3
89	G1
	G2
90	H1
	H2
91	E1
	E2
	F1
92	G3
	G4
93	K1
	(Treas. Is 50%)
MARIN COUNTY	
94	A1
95	A2
96	A3
97	K33(E)15%
98	K33(S)10%
99	K33(N)50%
100	K33(W)25%
101	J32
102	A4
103	A5
104	B6
105	B7
106	B8
107	C9
108	C10
109	C11
110	C12
111	D13
112	E14
113	E15
114	E16
115	E17
116	E18(W)50%
117	E18(E)50%
118	E19
119	E20
120	E21
121	E22
122	F23
123	F24
124	F25
125	G26
126	G27
127	G28(E)50%
128	G28(W)50%
129	H29
130	H30(W)50%
131	H30(E)50%
132	H31(W)50%
133	H31(E)50%

PLATE V-1

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
1	1965	49.70	18.66	10.66	4.00	8.00	8.88	0.10	3.54	11.95	46.99
	1990	46.62	29.68	7.91	4.13	10.80	0.88	0.06	3.43	12.27	64.68
	2020										
2	1965	14.09	4.02	48.99	4.02	22.14	6.71	2.17	14.54	28.68	8.81
	1990	16.37	8.45	40.87	4.02	30.33	0	1.79	15.85	32.30	15.39
	2020										
3	1965	6.20	20.15	58.14	0	11.63	3.88	1.68	32.20	75.22	24.20
	1990	5.96	25.96	36.66	0	31.32	0	1.21	37.59	91.89	44.46
	2020										
4	1965	8.89	44.44	40.00	0	6.67	0	3.69	48.44	106.53	44.49
	1990	8.89	46.67	0	0	44.44	0	1.89	60.27	139.92	67.07
	2020										
5	1965	5.00	45.00	26.67	0	20.00	3.33	1.35	74.12	152.43	223.12
	1990	0	54.50	0	0	45.50	0	0.83	118.76	274.58	343.97
	2020										
6	1965	6.72	18.49	66.39	0	5.04	3.36	2.55	33.87	83.62	20.64
	1990	6.72	20.08	45.54	0	24.37	3.19	1.88	36.95	93.75	32.54
	2020										
7	1965	1.63	6.50	81.30	0	6.50	4.07	4.45	30.60	84.47	13.07
	1990	2.28	12.19	57.32	0	28.05	0	3.42	37.93	103.17	22.86
	2020										

PLATE V-2

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
8	1965	0.89	21.43	61.61	0	12.50	3.57	1.30	79.03	116.01	95.80
	1990	0.89	25.89	0	0	58.22	15.00	0.95	108.56	197.78	130.28
	2020										
9	1965	18.39	40.23	5.75	0	9.19	26.44	0	13.25	22.24	123.56
	1990	20.11	61.72	0	0.12	16.90	1.15	0	15.89	31.83	235.11
	2020										
10	1965	2.11	83.80	1.41	0	4.23	8.45	0.06	10.60	12.89	748.12
	1990	0	95.63	0	0	4.23	0	0.03	27.38	55.79	1152.26
	2020										
11	1965	1.04	75.00	11.46	0	4.17	8.33	0.25	95.05	110.16	147.02
	1990	1.04	82.29	0	0	16.67	0	0.14	126.83	206.64	234.20
	2020										
12	1965	5.55	46.66	38.88	0	5.55	4.44	0.76	66.62	93.48	56.88
	1990	5.55	48.88	0	0	33.88	11.66	0.53	71.80	117.85	80.02
	2020										
13	1965	4.34	52.17	30.43	0	4.34	8.69	0.39	86.07	112.13	63.52
	1990	4.34	58.47	0	0	36.95	0	0.21	97.17	155.28	93.16
	2020										
14	1965	5.45	40.90	8.18	0	37.27	8.18	0.99	34.78	42.82	126.07
	1990	5.45	49.09	0	0	45.45	0	0.58	43.79	71.48	220.64
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
15	1965	1.08	2.52	26.71	4.69	37.54	27.43	1.48	9.32	20.09	27.03
	1990	1.08	3.24	22.38	9.38	42.59	21.22	1.45	8.86	19.79	39.45
	2020										
16	1965	0	0.62	45.96	9.93	16.77	26.70	2.42	11.31	26.15	2.96
	1990	0	1.18	39.93	14.90	23.41	20.49	2.41	10.46	25.26	7.35
	2020										
17	1965	1.63	15.57	76.22	0	4.09	2.45	4.44	15.43	42.29	15.33
	1990	1.63	18.03	64.09	0	16.22	0	4.20	14.62	41.31	24.95
	2020										
18	1965	1.51	8.33	68.93	0	20.45	0.75	2.25	20.39	50.30	8.13
	1990	1.51	9.84	57.65	0	30.98	0	2.04	19.84	50.76	15.49
	2020										
19	1965	2.19	19.78	72.52	0	3.29	2.19	2.11	25.42	56.29	11.03
	1990	2.19	21.97	60.54	0	15.27	0	1.90	24.61	56.46	21.04
	2020										
20	1965	0	6.74	69.66	0	17.97	5.61	2.03	35.35	67.88	13.70
	1990	0	11.23	57.97	0	30.78	0	1.76	37.78	76.02	25.56
	2020										
21	1965	0	0	87.40	0	8.88	3.70	5.17	9.13	36.38	8.56
	1990	0.81	5.85	80.07	0.14	13.03	0	5.02	9.35	37.24	13.79
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
22	1965	1.43	7.19	80.57	0	7.19	3.59	5.40	8.65	39.81	12.31
	1990	1.43	10.14	74.24	0	14.24	0	5.44	9.00	41.93	26.86
	2020										
23	1965	2.05	8.90	69.17	0	15.75	4.10	2.46	24.13	52.35	15.10
	1990	2.53	13.69	55.27	0	28.21	0	2.18	23.91	54.12	23.12
	2020										
24	1965	8.33	42.85	26.19	0	14.28	8.33	0.35	23.70	38.55	51.94
	1990	8.33	52.26	8.57	0	30.71	0	0.23	24.81	45.41	100.04
	2020										
25	1965	2.84	25.11	47.39	0	15.16	9.47	2.51	20.36	53.67	25.04
	1990	3.27	34.02	26.49	0	26.35	9.90	1.78	21.03	56.76	34.19
	2020										
26	1965	1.13	17.04	66.47	0	11.36	3.97	2.45	11.98	35.70	28.36
	1990	1.13	20.45	58.29	0	20.11	0	2.31	11.78	36.29	43.98
	2020										
27	1965	0	9.85	74.64	0	11.26	4.22	5.93	19.69	39.45	5.30
	1990	0	14.08	60.98	0	24.92	0	5.85	18.92	39.93	14.58
	2020										
28	1965	0.99	10.44	44.27	0	41.79	2.48	3.60	7.76	30.86	35.19
	1990	0.99	13.38	35.72	0	49.85	0	3.37	8.30	32.50	43.35
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
29	1965	5.69	9.75	61.78	0	10.56	12.19	1.50	27.85	70.13	16.63
	1990	7.39	23.98	40.81	0.16	27.64	0	0.87	31.47	82.56	27.05
	2020										
30	1965	7.54	30.81	31.44	0	17.61	12.57	2.32	21.81	52.21	17.27
	1990	8.30	43.39	12.07	0.12	33.14	2.89	1.68	24.90	61.93	28.29
	2020										
31	1965	5.88	29.41	20.58	0	38.23	5.88	1.66	22.78	40.74	46.82
	1990	3.97	36.76	0	0	59.11	0	0.87	24.73	47.87	94.01
	2020										
32	1965	6.56	12.40	61.31	0	17.51	2.18	1.08	28.67	69.10	5.96
	1990	6.71	14.96	39.56	0	32.11	6.64	0.63	27.89	71.35	12.74
	2020										
33	1965	1.08	15.13	67.02	0	13.51	3.24	2.75	23.43	63.86	22.20
	1990	1.08	17.83	49.02	0	26.32	5.72	2.22	24.49	68.46	29.34
	2020										
34	1965	0.81	5.73	55.73	0	34.42	3.27	1.42	19.18	48.54	2.55
	1990	0.81	7.21	40.40	0	50.73	0.81	0.92	20.43	53.45	7.94
	2020										
35	1965	2.71	17.93	55.97	0	20.10	3.26	3.43	25.41	62.59	17.81
	1990	2.71	20.65	25.65	0	35.48	15.48	2.07	30.07	74.54	27.48
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
36	1965	0	0.86	68.69	0	20.86	9.56	4.97	9.49	33.97	9.44
	1990	1.21	10.17	53.30	1.21	33.82	0	4.38	9.86	34.45	15.17
	2020										
37	1965	0.65	3.94	87.50	0	5.26	2.63	3.91	19.89	60.76	4.56
	1990	3.02	14.01	68.68	0.59	13.81	0	3.44	19.24	60.75	10.20
	2020										
38	1965	50.69	22.22	2.08	0	17.36	7.63	0.17	2.89	18.53	61.00
	1990	43.68	37.08	0	0	19.37	0	0.08	4.25	22.23	114.93
	2020										
39	1965	21.07	56.85	5.35	0	7.69	9.03	0.44	19.00	22.73	245.14
	1990	12.24	73.87	0	0	13.87	0	0.16	30.86	55.36	353.93
	2020										
40	1965	51.44	24.85	9.82	0	6.35	7.51	0.99	13.35	27.54	48.33
	1990	42.36	41.38	0	0	16.18	0	0.36	16.24	35.84	98.18
	2020										
41	1965	57.61	22.63	2.05	0	10.28	7.40	0.21	1.73	5.37	39.78
	1990	49.38	38.31	0	0	12.34	0	0.13	1.91	5.95	64.95
	2020										
42	1965	91.53	0.26	0	0	0.26	7.93	0.01	0	0.12	22.40
	1990	88.59	9.02	0	0.44	0.26	1.66	0.01	0	0.12	27.88
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
43	1965	57.79	11.92	6.42	0	11.00	12.84	0.17	3.08	8.97	45.06
	1990	57.47	25.64	3.80	0	13.07	0	0.09	3.08	9.30	72.40
	2020										
44	1965	50.96	2.68	29.65	0	3.87	12.81	2.70	2.78	17.67	11.13
	1990	55.81	8.27	15.30	0.46	7.58	12.57	2.04	2.59	15.78	13.75
	2020										
45	1965	26.28	5.44	35.25	0	23.39	9.61	3.34	6.23	31.91	29.15
	1990	27.91	12.56	17.08	0	32.59	9.87	2.25	9.14	36.77	38.47
	2020										
46	1965	9.09	12.29	60.96	0	16.04	1.60	3.84	11.82	47.69	9.94
	1990	6.84	15.24	36.79	0	27.21	13.95	2.71	13.01	49.29	15.15
	2020										
47	1965	47.26	3.52	22.70	0	14.18	12.32	2.47	0.65	10.45	15.10
	1990	48.22	14.53	18.56	0.61	18.01	0.06	2.30	0.94	10.84	19.32
	2020										
48	1965	10.96	1.25	16.94	0	37.46	33.36	0.92	1.94	11.38	8.92
	1990	15.25	4.29	13.89	6.95	40.35	19.23	0.89	1.60	11.01	11.95
	2020										
49	1965	13.57	0.67	19.39	0	17.84	48.49	1.31	0.42	5.85	3.03
	1990	36.54	5.78	19.65	5.56	21.18	11.25	1.32	0.48	6.28	6.90
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
50	1965	1.15	11.96	61.00	0	18.14	7.72	7.37	5.81	38.70	9.22
	1990	2.66	21.73	35.32	1.93	27.25	11.00	6.11	7.48	40.64	13.91
	2020										
51	1965	4.96	5.20	62.17	0	17.96	9.69	6.57	3.71	31.72	2.66
	1990	12.64	6.92	35.91	0	23.16	21.32	5.27	4.04	29.49	5.97
	2020										
52	1965	0.90	7.46	61.99	0	25.79	3.84	5.31	2.31	23.04	2.63
	1990	1.80	12.17	51.26	0.88	31.53	2.35	4.85	2.68	23.12	4.94
	2020										
53	1965	0.53	3.71	85.94	0	7.16	2.65	9.68	1.38	34.53	8.28
	1990	1.06	6.76	71.08	0	14.03	7.00	9.03	2.12	33.08	6.63
	2020										
54	1965	1.14	4.18	65.01	0	27.35	2.28	0.68	7.32	22.58	6.33
	1990	1.33	6.15	61.17	0	31.33	0	0.72	6.19	20.73	9.36
	2020										
55	1965	1.62	10.56	60.43	0	20.59	6.71	7.71	0.98	25.26	4.61
	1990	2.22	19.56	54.22	0.24	23.73	0	7.52	1.37	26.17	8.13
	2020										
56	1965	0.51	7.23	66.66	0	16.79	8.78	6.29	1.24	21.95	2.76
	1990	1.03	10.72	67.13	0.33	20.74	0	6.47	1.72	24.37	5.57
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
57	1965	9.33	1.03	23.47	41.24	16.08	5.31	1.75	0.81	10.02	0.73
	1990	9.76	2.67	27.04	41.66	18.85	0	1.81	0.87	10.65	1.69
	2020										
58	1965	2.57	5.39	69.40	0	9.76	12.85	7.17	1.48	27.48	2.96
	1990	3.70	10.71	67.81	1.23	16.55	0	7.18	2.06	29.70	5.60
	2020										
59	1965	23.85	37.61	16.51	0	13.76	8.25	0.75	18.87	37.78	60.98
	1990	23.85	45.96	0	0	30.27	0	0.28	19.17	41.33	108.34
	2020										
60	1965	12.41	15.68	53.59	0	17.64	0.65	2.10	24.14	60.44	20.67
	1990	12.41	17.64	32.15	0	33.98	3.79	1.25	27.70	70.89	30.61
	2020										
61	1965	0	0.76	61.97	0	20.91	16.34	5.09	7.14	27.99	1.25
	1990	1.17	6.88	57.79	1.25	30.64	2.24	5.04	8.47	32.09	4.56
	2020										
62	1965	0	4.54	83.11	0	7.14	5.19	7.12	9.41	43.88	4.10
	1990	1.68	13.44	59.02	1.36	19.48	5.00	6.09	10.28	44.63	9.16
	2020										
63	1965	2.15	4.31	71.94	0	16.54	5.03	3.88	13.29	40.66	6.51
	1990	3.66	15.97	51.15	0.71	28.41	0	1.51	14.40	42.64	12.79
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
64	1965	4.21	9.63	76.50	0	7.22	2.40	3.04	24.12	64.98	8.49
	1990	4.21	11.92	53.37	0	21.56	8.91	2.17	26.28	71.68	14.70
	2020										
65	1965	4.87	40.85	44.51	0	6.70	3.04	3.67	23.15	52.63	33.84
	1990	4.87	43.90	18.71	0	23.29	9.14	2.21	28.27	65.88	48.50
	2020										
66	1965	0.34	5.24	78.67	0	5.94	9.79	5.67	9.24	41.23	2.50
	1990	1.99	11.78	63.98	1.39	15.76	5.06	4.86	10.94	46.09	6.07
	2020										
67	1965	0	0	39.41	0	26.14	34.43	2.93	1.36	11.78	0.74
	1990	0.53	4.43	56.51	2.44	36.05	0	3.82	2.58	18.43	3.49
	2020										
68	1965	0	2.50	61.50	0	13.66	22.32	5.55	5.04	29.51	2.41
	1990	1.20	7.65	53.62	2.91	21.04	13.57	5.24	6.24	32.84	5.04
	2020										
69	1965	4.67	0.31	37.38	0	49.22	8.41	2.27	4.40	21.37	20.10
	1990	4.84	2.81	36.47	0.03	54.34	1.47	2.44	4.14	22.00	26.61
	2020										
70	1965	1.74	12.79	79.06	0	4.65	1.74	6.31	13.72	48.20	8.23
	1990	1.74	13.95	66.91	0	15.87	1.51	6.20	12.98	48.13	14.32
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
71	1965	0.18	1.41	80.78	0	6.59	11.03	7.18	1.64	23.75	3.46
	1990	1.17	7.26	80.94	0.47	10.18	0	7.35	2.06	25.79	6.04
	2020										
72	1965	0.23	4.67	78.04	0	11.68	5.38	6.21	0.50	19.09	3.57
	1990	0.65	7.36	77.94	0.14	13.86	0	6.26	0.61	19.79	6.31
	2020										
73	1965	2.29	0	67.05	11.17	5.73	13.76	6.20	0.77	20.54	1.04
	1990	3.15	3.93	70.86	12.06	10.00	0	6.44	1.18	22.71	3.33
	2020										
74	1965	0	2.89	53.43	0	38.27	5.41	6.81	0.82	21.53	3.19
	1990	0.18	4.91	46.14	0	45.85	2.89	6.47	1.13	21.79	7.23
	2020										
75	1965	18.45	2.91	64.56	0	12.62	1.46	5.21	0.03	15.50	2.88
	1990	18.54	3.79	63.16	0	14.51	0	5.18	0.14	15.81	5.84
	2020										
76	1965	0.22	2.64	87.03	0	7.91	2.20	5.07	0.08	16.23	3.19
	1990	0.37	3.71	87.08	0	8.86	0	5.13	0.16	16.77	5.55
	2020										
77	1965	0	6.18	77.09	0	13.09	3.64	8.10	0.63	27.59	2.06
	1990	0.25	8.44	74.11	0.04	17.20	0	8.11	1.13	29.44	5.09
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
78	1965	0.50	3.01	75.94	0	11.78	8.77	8.15	0.90	28.79	2.57
	1990	1.68	8.30	72.56	0.63	16.87	0	8.14	1.72	31.62	5.24
	2020										
79	1965	0.21	3.09	85.57	0.82	8.87	1.44	9.00	2.52	32.47	2.58
	1990	0.33	4.31	83.48	0.82	11.03	0	9.16	2.89	34.74	5.26
	2020										
80	1965	0	2.45	81.51	0.89	14.03	1.11	8.65	1.30	30.55	2.43
	1990	0	3.12	80.40	0.89	15.59	0	8.78	1.60	32.25	4.97
	2020										
81	1965	0.23	5.14	88.78	0.94	3.97	0.94	8.89	3.00	31.08	4.61
	1990	0.23	5.84	84.58	0.93	8.41	0	8.98	3.26	32.78	8.31
	2020										
82	1965	8.60	4.05	77.57	0	8.60	1.18	8.52	0.77	25.29	3.00
	1990	8.60	5.06	75.23	0	11.11	0	8.53	0.97	26.24	5.58
	2020										
83	1965	0.26	3.44	68.52	16.93	9.79	1.06	6.47	0.33	19.57	2.47
	1990	0.45	4.44	67.20	16.93	11.00	0	6.46	0.45	20.12	4.98
	2020										
84	1965	0	6.97	81.00	0	9.50	2.71	5.34	0	16.05	2.43
	1990	0.09	8.28	81.49	0.05	10.05	0	5.43	0.10	16.71	5.61
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
85	1965	0	13.18	42.27	0	42.05	2.50	4.09	5.47	21.23	12.85
	1990	0	15.68	40.18	0	44.14	0	4.18	5.17	21.55	19.06
	2020										
86	1965	30.95	0	1.66	56.39	1.86	9.14	0.21	0.01	0.71	0.30
	1990	30.95	0.42	3.65	58.48	2.87	3.61	0.28	0.04	1.03	0.75
	2020										
87	1965	0	0.44	4.22	34.43	60.47	0.44	0	0.41	2.25	2.67
	1990	0	0.48	4.16	34.51	60.49	0.36	0.01	0.33	2.15	3.82
	2020										
88	1965	1.28	11.80	72.56	0	12.82	1.54	5.21	12.31	44.81	10.68
	1990	1.28	13.08	65.31	0	20.33	0	5.40	12.19	47.18	15.99
	2020										
89	1965	0.32	3.88	89.97	0	4.53	1.30	6.26	10.08	41.53	3.28
	1990	0.32	4.85	82.85	0	11.98	0	6.40	10.00	43.40	6.98
	2020										
90	1965	1.24	6.61	84.30	0	5.78	2.07	5.95	11.38	45.58	4.44
	1990	1.32	8.47	73.10	0	15.00	2.15	5.91	10.98	46.41	8.92
	2020										
91	1965	0	2.70	42.41	48.65	5.20	1.04	2.85	3.04	16.16	4.41
	1990	0	3.64	41.21	48.65	6.53	0	2.95	2.81	16.45	6.76
	2020										

SAN FRANCISCO DATA PROJECTIONS BASED ON S.F. BAY DELTA WATER QUALITY CONTROL PROGRAM (BASS IV)

DEMOGRAPHIC AREA NUMBER	YEAR	LAND USE (% OF GROSS AREA)						HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION, AND UTILITIES	RESIDENTIAL	PARK AND RECREATIONAL	INSTITUTIONS & PUBLIC LAND	VACANT LAND	SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
		a	b	c	d	e	f	g	h	i	j
92	1965	0.36	4.09	74.42	0	14.03	7.10	6.90	4.10	28.15	3.18
	1990	0.57	5.61	72.81	1.21	16.02	3.77	7.09	4.12	29.72	6.09
	2020										
93	1965	50.70	22.22	2.08	7.64	9.72	7.64	0.17	2.89	18.53	15.93
	1990	50.76	29.58	0	7.64	11.88	0	0.07	1.73	16.11	56.76
	2020										
	1965										
	1990										
	2020										
	1965										
	1990										
	2020										
	1965										
	1990										
	2020										
	1965										
	1990										
	2020										
	1965										
	1990										
	2020										

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, POPULATION & EMPLOYMENT

SUMMARY FOR NPWPCP

AREA CLASSIFICATION	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION & UTILITIES	RESIDENTIAL	PUBLIC LANDS & ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
MONITORED AREAS	1965	15.12	17.81	44.31	22.76	(7894)	20043	143756	343179	430171
	1990	14.55	25.32	30.05	30.08	(7894)	16076	171314	423842	631369
NON-MONITORED AREAS	1965	16.36	2.24	10.25	71.15	(1433)	569	3888	10657	19725
	1990	15.56	4.63	8.96	70.85	(1433)	551	3853	10977	27217
TOTAL AREA	1965	15.31	15.42	39.08	30.19	(9327)	20612	147644	453836	449896
	1990	14.71	22.14	26.81	36.34	(9327)	16627	175167	434819	658586

PLATE VI-1

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, POPULATION & EMPLOYMENT

SUMMARY FOR RSWPCP

AREA CLASSIFICATION	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION & UTILITIES	RESIDENTIAL	PUBLIC LANDS & ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
MONITORED AREAS	1965	2.01	4.53	64.13	29.33	(8904)	50197	29996	215958	47390
	1990	2.18	6.32	61.54	29.96	(8904)	50481	30555	225793	77984
NON-MONITORED AREAS	1965	0	0.47	6.57	92.96	(1499)	521	759	4070	2126
	1990	0	0.60	6.40	93.00	(1499)	545	677	4072	3124
TOTAL AREA	1965	1.72	3.94	55.84	38.50	(10403)	50718	30755	220028	49516
	1990	1.87	5.49	53.60	39.04	(10403)	51026	31232	229865	81108

PLATE VI-2

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, POPULATION & EMPLOYMENT

SUMMARY FOR SEWPCP

AREA CLASSIFICATION	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL, TRANSPORTATION & UTILITIES	RESIDENTIAL	PUBLIC LANDS & ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
MONITORED AREAS	1965	12.44	4.32	48.76	34.48	(7201)	33769	14752	147816	42739
	1990	15.17	9.45	42.74	32.64	(7201)	31674	17408	150648	63901
NON-MONITORED AREAS	1965	14.06	1.39	17.78	66.77	(1577)	1666	3076	18435	14513
	1990	18.30	4.77	14.09	62.84	(1577)	1560	2579	17758	19308
TOTAL AREA	1965	12.73	3.80	43.19	40.28	(8778)	35435	17828	166251	57252
	1990	15.73	8.61	37. 59	38.07	(8778)	33234	19987	168406	83209

PLATE VI-3

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
200	1965	0.91	6.54	63.27	29.28	(186)	723	1647	5884	1878
	1990	1.03	9.02	56.30	33.65	(186)	711	1628	5990	3509
211	1965	1.16	9.64	74.50	14.70	(290)	1066	4596	12451	3332
	1990	1.40	12.76	64.50	21.34	(290)	1011	4465	12459	5652
220	1965	4.69	14.66	63.62	17.03	(357)	814	9334	21204	15741
	1990	4.95	17.66	50.18	27.11	(357)	679	10077	23705	25060
241	1965	19.98	16.95	45.62	17.45	(334)	703	7446	18302	9611
	1990	19.45	23.79	29.21	27.55	(334)	505	8870	22337	14776
260 TO 377	1965	36.26	24.25	18.83	19.96	(2366)	2586	32443	73481	270700
	1990	34.30	34.82	7.41	23.27	(2366)	1612	44005	104061	380410

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
290	1965	33.61	26.87	14.09	25.43	(218)	280	2060	5672	27045
	1990	29.85	33.91	5.85	25.41	(218)	181	3204	8590	42499
353	1965	1.05	75.00	11.48	12.47	(22)	6	2091	2423	3234
	1990	1.05	82.27	0	16.68	(22)	3	2791	4546	5153
352 & 372	1965	7.97	45.01	26.48	20.54	(575)	454	30890	42174	54774
	1990	6.53	53.41	5.18	34.88	(575)	308	38038	64962	86378
374	1965	4.09	18.28	53.12	24.51	(791)	1870	17539	43605	15233
	1990	4.66	26.81	34.87	33.66	(791)	1440	18529	47771	23314
378 & 379	1965	3.31	12.27	58.39	26.08	(306)	967	6478	16685	4208
	1990	3.58	16.06	34.68	45.68	(306)	647	7408	19193	6715

PLATE VI-5

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
770	1965	2.16	7.76	60.10	29.98	(728)	2019	11986	35188	11484
	1990	2.77	12.15	46.95	38.13	(728)	1792	12187	36983	16192
771	1965	18.65	10.71	44.80	25.84	(186)	658	1774	7256	4275
	1990	18.81	16.07	23.93	41.19	(186)	447	2241	8083	5831
772	1965	1.88	9.07	68.96	20.09	(627)	2850	8997	27791	5619
	1990	2.84	15.70	51.04	30.42	(627)	2196	10141	30761	9576
432	1965	0.27	3.28	66.68	29.77	(733)	3978	5531	25202	1861
	1990	1.52	9.17	58.41	30.90	(733)	3666	6574	28416	4448
430 & 431	1965	19.94	8.27	48.10	23.69	(655)	3107	3743	20551	7575
	1990	21.95	15.06	28.60	34.39	(655)	2484	4432	21176	10679

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
110	1965	2.14	12.27	39.46	46.13	(216)	825	1100	4279	2588
	1990	2.14	14.62	37.66	45.58	(216)	845	1040	4349	3843
112	1965	0	10.11	59.24	30.65	(360)	1889	1112	7665	2874
	1990	0.08	12.31	57.61	30.00	(360)	1916	1101	7927	4597
113	1965	0.42	7.01	72.03	20.54	(290)	2284	265	7828	892
	1990	0.85	11.13	68.29	19.73	(290)	2274	406	8323	1822
114	1965	8.51	9.42	72.20	15.27	(675)	4251	220	13830	1843
	1990	8.87	5.52	70.94	14.67	(675)	4249	438	14606	3739
120	1965	0	2.44	81.53	16.03	(32)	277	42	978	78
	1990	0	3.12	80.41	16.47	(32)	281	51	1032	159

PLATE VI-7

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
121	1965	0	2.45	81.50	16.05	(20)	173	26	611	49
	1990	0	3.10	80.40	16.50	(20)	176	32	645	99
122 & 123	1965	9.78	2.65	54.37	33.80	(237)	1328	155	4441	435
	1990	9.82	2.74	54.07	33.37	(237)	1346	100	4671	883
124	1965	0.23	4.15	76.65	18.97	(553)	3524	321	10901	1861
	1990	0.66	6.81	76.38	16.15	(553)	3552	358	11346	3348
125	1965	0.56	4.02	78.76	16.66	(457)	2648	88	8140	1274
	1990	0.71	5.24	78.34	15.71	(457)	2667	135	8413	2474
126	1965	1.28	3.25	74.27	21.20	(250)	1713	182	5301	742
	1990	1.68	5.70	73.39	19.23	(250)	1725	232	5547	1386

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PLATE VI-8

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
132	1965	0.10	1.86	53.89	44.15	(188)	1068	261	3831	305
	1990	0.15	2.55	52.73	44.57	(188)	1086	303	4085	621
134 & 135	1965	1.25	3.02	57.92	37.81	(1387)	7983	2801	28615	3812
	1990	1.40	4.28	55.72	38.60	(1387)	8070	3025	30156	6933
137 & 138	1965	2.35	3.66	62.27	31.72	(502)	2480	2812	14256	5652
	1990	2.78	6.99	59.09	31.14	(502)	2532	2746	14736	8148
139	1965	3.38	1.12	42.52	45.98	(387)	1370	1325	8257	5922
	1990	3.70	4.12	48.89	43.29	(387)	1429	1282	8578	8010
881	1965	0.22	4.71	88.04	7.03	(31)	276	90	973	129
	1990	0.25	5.50	84.37	9.88	(31)	279	99	1030	237

PLATE VI-9

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
136	1965	6.72	3.67	78.87	10.74	(384)	3242	411	9988	1150
	1990	6.83	5.19	76.82	11.16	(384)	3259	505	10457	2146
141	1965	0.20	2.30	41.72	55.78	(107)	414	246	1689	191
	1990	0.33	3.15	40.82	55.70	(107)	426	247	1783	366
140	1965	0.40	4.10	74.40	21.10	(10)	69	41	282	32
	1990	0.60	5.60	72.80	21.00	(10)	71	41	297	61
142	1965	0.28	3.20	58.73	37.79	(484)	2616	1614	10821	1209
	1990	0.45	4.39	57.35	37.81	(484)	2688	1620	11421	2322
144	1965	0.66	2.84	83.01	13.49	(442)	3886	793	13717	1119
	1990	0.72	3.77	81.40	14.11	(442)	3946	936	14555	2270

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
160, 161, & 180	1965	0.37	4.72	66.19	28.72	(536)	2579	3782	16416	2544
	1990	0.40	5.76	61.91	31.93	(536)	2655	3719	17134	4308
181 & 182	1965	0.67	4.92	51.33	43.08	(846)	3072	6091	23709	3368
	1990	0.69	5.85	45.65	47.81	(846)	3112	5964	24545	5821
183	1965	0.96	11.74	66.51	20.79	(510)	2230	6218	19430	9321
	1990	0.96	14.53	57.82	26.69	(510)	1897	6175	20157	14391
	1965									
	1990									
	1965									
	1990									

PLATE VI-11

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
400 & 401	1965	50.98	2.68	29.66	16.68	(220)	594	612	3887	2449
	1990	55.82	8.27	15.30	20.61	(220)	449	570	3472	3025
420	1965	40.80	2.45	25.64	31.11	(145)	325	331	2198	1616
	1990	44.99	8.17	15.41	31.43	(145)	261	308	2022	2042
430 & 431	1965	24.79	8.06	44.17	22.98	(502)	2068	2897	14943	6517
	1990	26.51	14.66	26.24	32.59	(502)	1628	3408	15465	8988
440	1965	52.37	4.85	36.06	26.72	(524)	2068	901	9637	6059
	1990	34.89	13.59	24.58	26.94	(524)	1783	1237	9622	8182
441	1965	2.76	6.11	63.06	28.07	(486)	2830	1543	13337	1466
	1990	6.72	9.26	45.41	38.61	(486)	2428	1688	12800	2762

PLATE VI-12

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
442	1965	1.26	4.94	75.68	18.12	(460)	3792	668	13761	3021
	1990	1.80	8.81	64.72	24.67	(460)	3586	928	13480	2963
443	1965	0.39	2.43	61.24	35.94	(227)	1213	921	5993	628
	1990	1.29	6.59	55.30	36.82	(227)	1165	1085	6484	1277
444	1965	1.14	2.08	61.33	35.45	(466)	2408	1069	9968	1437
	1990	1.58	4.82	59.10	34.50	(466)	2395	1077	10205	2899
445	1965	1.11	6.96	65.37	26.56	(530)	3732	855	13692	2144
	1990	1.81	13.55	60.21	24.43	(530)	3670	1046	14319	4158
446	1965	0.83	7.25	66.97	24.93	(430)	3077	465	10563	1409
	1990	1.54	12.85	64.49	21.12	(430)	3089	693	11448	2696

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
447	1965	0.51	7.23	66.68	25.58	(300)	1887	372	6585	828
	1990	1.03	10.73	67.20	21.04	(300)	1941	516	7311	1671
448	1965	0.34	0.81	53.15	45.70	(300)	1835	963	6136	391
	1990	1.21	5.64	58.27	34.88	(300)	1432	1298	5124	1216
449	1965	1.15	4.17	65.02	29.66	(40)	27	293	903	253
	1990	1.33	6.15	61.19	31.33	(40)	29	248	829	374
450	1965	47.27	3.52	22.70	26.51	(66)	163	43	690	997
	1990	48.23	14.53	18.56	18.68	(66)	152	62	715	1275
460	1965	28.16	2.33	19.67	49.84	(57)	94	76	624	675
	1990	30.88	9.14	16.10	43.88	(57)	89	73	623	880

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
480	1965	23.07	2.32	19.66	49.95	(278)	459	370	3042	3289
	1990	30.80	9.11	16.09	44.00	(278)	432	358	3039	4288
510	1965	10.96	1.25	16.95	70.84	(182)	168	353	2071	1624
	1990	15.26	4.29	13.89	66.56	(182)	162	291	2004	2175
521	1965	11.57	1.11	17.54	69.78	(38)	38	60	383	286
	1990	20.31	4.63	15.26	59.80	(38)	38	51	376	409
522	1965	21.50	1.58	22.33	54.59	(237)	438	124	1874	1430
	1990	38.07	8.16	21.42	32.35	(237)	429	157	1992	2355
523	1965	42.59	3.56	24.64	29.21	(220)	561	160	2386	3003
	1990	44.95	13.85	20.41	20.79	(220)	523	221	2468	3904

PLATE VI-15

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
524	1965	6.65	3.27	42.62	47.46	(552)	1958	702	8920	1024
	1990	7.30	6.31	39.49	46.90	(552)	1914	827	9292	1851
540	1965	11.29	1.65	29.76	57.30	(256)	646	164	2644	772
	1990	29.75	6.80	29.63	33.82	(256)	649	207	2849	1698
541	1965	4.77	4.06	52.76	38.41	(685)	3388	809	13579	1421
	1990	5.52	7.65	52.16	34.67	(685)	3430	1059	14709	2813
	1965									
	1990									
	1965									
	1990									

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PLATE VII-16

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT
NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
20001	1965	0.91	6.54	63.27	29.28	(186)	722	1646	5078	1873
	1990	1.03	9.02	56.30	33.65	(186)	709	1628	5136	3509
21270	1965	1.47	11.47	71.33	15.73	(174)	520	3229	8079	2039
	1990	1.00	14.08	60.09	23.46	(174)	487	3135	8105	3589
21271	1965	0.73	7.91	82.14	9.77	(49)	237	592	1919	575
	1990	1.20	11.38	72.60	14.82	(49)	227	579	1918	932
21272	1965	0.74	7.10	76.69	15.43	(67)	299	822	2322	726
	1990	1.08	10.09	67.39	20.84	(67)	287	796	2507	1201
22280	1965	1.54	10.89	69.87	17.70	(67)	147	1529	3563	622
	1990	1.54	12.81	58.33	27.37	(67)	133	1505	3632	1181

PLATE VI-17

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT
NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
22281	1965	9.37	5.65	56.48	28.50	(44)	97	736	1619	377
	1990	10.79	8.97	47.15	33.09	(44)	82	764	1726	679
22290	1965	7.00	13.72	63.47	15.81	(81)	187	2021	4700	1101
	1990	7.63	16.22	49.41	26.74	(81)	152	2120	5086	1867
22291	1965	3.55	19.09	63.09	14.27	(165)	384	5052	11335	13607
	1990	3.42	22.89	48.07	25.62	(165)	311	5095	13274	21389
24300	1965	17.36	23.29	43.78	13.57	(134)	212	3683	8597	4395
	1990	16.45	29.88	24.23	29.39	(134)	137	4349	10615	7076
24301	1965	21.03	10.82	48.82	19.33	(200)	465	3594	9412	4875
	1990	20.73	18.06	35.74	25.47	(200)	360	4268	11214	7352

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
25000	1965	40.71	18.68	10.68	20.93	(8)	1	28	96	376
	1990	41.50	32.43	8.64	17.34	(8)	0	27	98	517
26000	1965	33.23	19.17	26.51	19.09	(15)	9	197	496	591
	1990	33.07	28.45	17.51	20.97	(15)	7	222	582	869
26261	1965	33.23	19.17	26.51	19.09	(31)	19	406	1024	1221
	1990	33.07	28.45	17.51	20.97	(31)	14	459	1203	1796
27000	1965	40.76	18.67	10.66	20.91	(37)	4	131	442	1739
	1990	41.50	29.66	7.91	15.93	(37)	2	127	454	2305
27310	1965	6.91	29.35	50.33	13.50	(93)	250	3930	8912	4702
	1990	5.52	34.75	22.67	36.06	(93)	156	4985	11908	7910

PLATE VI-19

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
28320	1965	20.05	30.24	7.40	30.71	(45)	2	431	946	4411
	1990	20.93	51.03	2.64	17.40	(45)	1	528	1139	8024
28321	1965	11.44	62.79	3.71	22.06	(61)	6	793	1103	26090
	1990	9.67	79.19	0	11.14	(61)	3	1440	2345	40980
28540	1965	4.07	58.13	25.02	17.79	(282)	173	8753	14613	115400
	1990	2.60	63.60	2.67	31.13	(282)	121	13735	20059	132118
28341	1965	30.35	24.41	2.58	22.68	(42)	10	190	745	3032
	1990	43.15	29.24	0	17.61	(42)	4	283	998	5301
28000	1965	39.05	14.76	16.83	23.56	(151)	239	662	3701	7083
	1990	33.65	26.16	7.58	29.61	(151)	158	971	4339	12239

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PLATE XVI-90

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
29001	1965	21.00	56.00	5.36	16.72	(67)	28	1275	1925	16442
	1990	12.56	73.00	0	13.55	(67)	10	2069	5713	23741
29000	1965	50.70	22.22	2.08	25.00	(53)	10	168	1075	3823
	1990	43.62	37.03	0	19.35	(53)	5	246	1289	6006
24000	1965	59.03	17.73	1.64	21.55	(29)	4	65	413	1456
	1990	52.06	31.20	0	15.85	(29)	2	95	495	2713
24530	1965	64.55	25.74	5.94	15.77	(61)	37	460	1004	2603
	1990	49.37	39.86	0	14.27	(61)	15	553	1275	4975
24531	1965	50.00	24.41	2.53	22.63	(71)	16	322	1259	5209
	1990	43.15	39.24	0	17.61	(71)	7	478	1588	9096

PLATE VII-21

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
35000	1965	80.92	7.53	0.67	11.28	(28)	2	15	51	705
	1990	75.85	18.55	0	5.60	(28)	1	18	57	1118
35360	1965	54.02	23.93	6.59	15.46	(80)	53	682	1467	3502
	1990	45.28	40.13	0	14.59	(80)	21	823	1875	6750
35361	1965	5.66	58.66	19.59	16.09	(174)	86	13997	17145	32539
	1990	3.58	67.89	0	28.53	(174)	57	18965	31829	50056
35362	1965	5.66	58.66	19.59	16.09	(19)	10	1555	1905	3618
	1990	3.53	67.89	0	28.53	(19)	6	2107	3537	5628
36000	1965	76.90	9.92	0.88	12.30	(44)	4	33	105	1316
	1990	71.67	21.60	0	6.67	(44)	3	36	116	1930

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
36370	1965	49.87	26.54	9.58	14.01	(95)	91	1296	2593	5575
	1990	40.01	43.12	0	16.07	(95)	34	1616	3503	10606
37380	1965	88.74	2.11	0.17	8.98	(70)	2	10	38	1668
	1990	85.38	11.44	0	3.18	(70)	1	11	42	2166
37381	1965	55.51	3.99	22.91	17.59	(232)	575	620	3472	4264
	1990	58.53	11.29	11.85	18.33	(232)	351	620	3234	5963
37382	1965	88.74	2.11	0.17	8.98	(57)	1	8	32	1359
	1990	85.38	11.44	0	3.18	(57)	1	9	34	1764
37390	1965	29.88	32.90	9.84	27.38	(109)	41	1952	3092	9634
	1990	24.22	45.81	0	29.97	(109)	49	2448	4586	16208

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37391	1965	27.74	22.74	26.65	22.87	(99)	138	1617	3660	4650
	1990	26.93	31.16	10.93	30.98	(99)	76	1833	4325	7673
37392	1965	6.76	21.26	44.90	27.08	(223)	375	5634	13237	3207
	1990	7.07	29.63	24.29	39.01	(223)	244	5981	14780	6790
37393	1965	27.74	22.74	26.65	22.87	(160)	222	2614	5915	7515
	1990	26.93	31.16	10.93	30.98	(160)	123	2962	6990	12401
37400	1965	5.14	14.22	52.09	28.55	(147)	306	3322	8614	3003
	1990	6.31	25.87	33.91	33.91	(147)	225	3749	10044	4486
37401	1965	2.38	18.49	56.41	22.72	(196)	401	3413	8344	3276
	1990	2.82	25.85	38.54	32.79	(196)	316	3485	8789	4652

PLATE VI-24

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37410	1965	2.44	19.52	56.66	21.38	(135)	413	2487	6815	2868
	1990	2.81	26.82	39.44	30.93	(135)	342	2555	7181	4100
37411	1965	2.23	14.86	61.59	21.32	(130)	347	2825	6770	2439
	1990	2.71	21.41	45.35	30.53	(130)	288	2847	7062	3522
37420	1965	27.74	22.74	26.65	22.87	(154)	214	2516	5694	7234
	1990	26.93	31.16	10.93	30.98	(154)	119	2851	6728	11936
37440	1965	33.64	19.57	25.32	21.47	(70)	69	1000	2378	2834
	1990	33.51	27.86	12.72	25.91	(70)	38	1093	2703	4671
37460	1965	1.43	7.80	56.15	34.60	(72)	120	1487	3728	347
	1990	1.47	9.52	38.38	50.63	(72)	76	1600	4136	782

PLATE A4-25

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37470	1965	6.54	12.39	61.36	19.71	(13)	14	373	898	77
	1990	6.70	14.95	39.60	38.75	(13)	8	363	928	166
37471	1965	1.14	9.65	70.35	18.86	(148)	402	3205	8838	1762
	1990	1.86	14.24	52.47	31.43	(148)	328	3281	9311	2693
37480	1965	1.89	14.73	66.18	17.20	(96)	241	2332	6224	1905
	1990	1.92	17.46	47.63	33.06	(96)	190	2408	6634	2587
37481	1965	2.73	11.31	52.16	33.81	(139)	381	2234	6498	3536
	1990	2.91	15.20	38.45	43.44	(139)	332	2315	6931	4642
37490	1965	1.02	4.24	73.70	20.44	(143)	539	2339	7251	1225
	1990	2.31	12.07	59.76	25.66	(143)	492	2349	7438	2013

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PLATE A-25

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37491	1965	3.52	1.49	42.37	52.62	(189)	434	1320	5066	3105
	1990	3.96	4.80	38.33	52.91	(180)	441	1276	5192	4222
37500	1965	18.65	10.71	44.80	25.84	(186)	658	1774	7255	4276
	1990	18.81	16.07	23.93	41.19	(186)	447	2241	8083	5831
37501	1965	9.90	27.20	47.43	15.47	(105)	371	1993	5169	2998
	1990	10.33	31.19	24.03	34.45	(105)	237	2424	6234	4255
37502	1965	9.90	27.20	47.43	15.47	(103)	364	1955	5071	2941
	1990	10.33	31.19	24.03	34.45	(103)	232	2378	6115	4174
37510	1965	2.78	10.35	74.87	12.00	(98)	401	1796	5380	797
	1990	3.42	14.33	54.80	27.45	(98)	315	2012	6017	1370

PLATE VI-27

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37511	1965	1.03	3.36	71.05	24.56	(426)	2077	4798	16563	2160
	1990	2.30	11.67	55.21	30.82	(426)	1627	5286	17731	4319
37520	1965	1.98	13.23	59.23	25.56	(78)	294	1651	4282	1191
	1990	2.29	17.62	33.15	46.94	(78)	205	1922	4970	1858
37521	1965	2.72	17.94	56.00	23.34	(52)	179	1323	3260	927
	1990	2.72	20.65	25.65	50.98	(52)	108	1568	3882	1431
37530	1965	55.83	23.29	4.32	16.56	(82)	36	420	970	3467
	1990	47.33	39.20	0	13.47	(82)	16	499	1203	6120
37531	1965	7.08	42.33	28.58	22.01	(404)	348	17935	25838	34372
	1990	6.21	50.18	7.41	36.20	(404)	238	20739	35748	54645

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
37670	1965	34.54	22.28	21.29	21.89	(47)	40	653	1493	2122
	1990	34.41	31.23	9.10	25.26	(47)	21	698	1677	3500
37671	1965	31.75	7.27	25.92	29.06	(107)	247	537	2549	3518
	1990	38.97	16.34	12.83	31.86	(107)	167	729	2869	5068
37690	1965	19.54	16.64	38.18	25.64	(50)	171	579	1924	1532
	1990	20.64	22.43	17.59	39.34	(50)	113	758	2297	2082
37691	1965	7.20	12.54	57.85	22.41	(104)	325	2177	5090	1806
	1990	7.31	16.49	35.94	40.06	(104)	230	2493	6561	2732
49001	1965	2.16	10.31	61.99	25.54	(153)	1069	944	5861	1176
	1990	5.01	17.91	36.32	40.76	(153)	878	1156	6045	1856

PLATE VI-29

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
43002	1965	4.20	9.64	76.52	9.64	(9)	27	217	585	77
	1990	4.20	11.94	53.38	30.48	(9)	20	236	645	132
43550	1965	0.22	4.02	70.48	25.28	(205)	1659	2272	10736	702
	1990	1.64	10.16	61.14	27.06	(205)	1468	2733	12170	1735
43551	1965	0	2.50	61.51	35.99	(143)	794	720	4220	345
	1990	1.20	7.66	53.62	37.52	(143)	749	892	4696	720
43552	1965	0	1.12	49.26	49.62	(108)	443	324	2126	160
	1990	0.83	5.87	55.23	38.07	(108)	481	455	2683	452
43553	1965	0.05	2.81	71.85	25.28	(190)	1108	1567	6752	453
	1990	1.49	9.88	59.40	29.23	(190)	1013	1808	7360	1194

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PLATE VI-20

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
PRESIDIO (N.P.)	1965	0	0.44	4.22	95.34	(850)	0	349	1913	2270
	1990	0	0.48	4.16	95.36	(850)	9	281	1828	3247
BAKER ST.	1965	0	0.62	45.96	53.42	(55)	133	622	1438	163
	1990	0	1.18	39.96	58.86	(55)	133	575	1389	404
MARINA	1965	0.85	2.53	34.99	61.63	(157)	278	1685	3783	3059
	1990	0.85	3.28	29.69	66.18	(157)	273	1596	3723	4630
FORT MASON	1965	1.08	2.52	26.72	69.68	(50)	74	466	1005	1352
	1990	1.08	3.24	22.48	73.28	(50)	73	443	990	1973
AQUATIC PK.	1965	21.01	7.10	40.95	30.34	(38)	66	464	956	640
	1990	22.47	12.76	34.66	30.11	(38)	54	503	1067	979

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED — NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
FERRY BLDG.	1965	35.71	42.14	3.86	28.29	(7)	3	85	147	1164
	1990	25.71	58.15	0	16.14	(7)	1	136	288	1761
CHANNEL NO.	1965	56.73	18.99	1.77	22.51	(88)	13	217	1392	4816
	1990	50.25	32.90	0	16.84	(88)	6	319	1669	8902
CHANNEL NO.	1965	91.55	0.26	0	8.19	(188)	2	0	23	4211
	1990	88.62	9.02	0	2.36	(188)	2	0	23	5241
	1965									
	1990									
	1965									
	1990									

PLATE VI-32

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
11000	1965	30.93	0	1.67	67.40	(20)	4	0	15	7
	1990	30.93	0.40	3.67	64.93	(20)	5	1	20	15
11010	1965	0	13.13	42.27	44.55	(196)	801	1071	4155	2515
	1990	0	15.68	40.18	44.14	(196)	818	1012	4217	3731
11021	1965	0.44	6.78	73.15	19.63	(290)	2326	216	7892	795
	1990	0.83	10.96	69.35	18.81	(290)	2315	365	8402	1604
11030	1965	0	6.79	81.80	11.41	(79)	390	0	1171	177
	1990	0.09	8.28	81.53	10.10	(79)	396	7	1219	409
11040	1965	0.08	4.93	80.75	14.29	(145)	1019	62	3414	361
	1990	0.30	6.69	78.87	14.14	(145)	1023	113	3613	767

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PLATE VI-33

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT
RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
11041	1965	0	15.13	42.27	44.55	(107)	1178	1575	6114	3701
	1990	0	15.68	40.18	44.14	(207)	1204	1489	6205	5400
11050	1965	9.55	3.27	70.68	16.50	(423)	2775	169	9109	1153
	1990	10.64	5.86	68.47	15.03	(423)	2768	340	9388	2351
11060	1965	16.57	2.68	67.12	13.63	(107)	556	4	1667	312
	1990	16.46	3.78	69.90	13.86	(107)	554	15	1704	622
12000	1965	0	2.45	81.32	16.23	(20)	171	26	604	48
	1990	0	3.11	80.41	16.48	(20)	173	32	638	98
12001	1965	0	2.45	81.52	16.03	(32)	279	42	985	78
	1990	0	3.11	80.41	16.48	(32)	283	51	1040	160

PLATE VII-5

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
12080	1965	12.33	1.47	49.57	36.63	(100)	528	79	1862	130
	1990	12.33	1.47	49.70	36.50	(100)	539	78	1977	329
12081	1965	0	2.46	81.51	16.03	(59)	511	77	1803	144
	1990	0	3.12	80.41	16.47	(59)	518	95	1903	294
12082	1965	2.55	3.28	75.04	18.62	(56)	442	46	1409	148
	1990	2.95	4.18	74.27	18.62	(56)	444	58	1469	291
12090	1965	0.75	4.17	76.59	18.91	(930)	3393	305	10361	1705
	1990	0.63	6.14	76.44	16.04	(930)	3580	377	10782	3205
12091	1965	0.87	3.63	69.50	27.77	(22)	143	8	431	55
	1990	0.43	4.43	67.13	27.91	(22)	143	10	443	110

PLATE VII-25

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT
RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
12100	1965	2.38	3.59	70.75	23.34	(65)	451	29	1357	168
	1990	2.46	4.59	69.17	23.78	(65)	451	37	1399	332
12101	1965	0.92	3.09	76.28	19.71	(250)	1713	222	5376	793
	1990	1.45	6.30	75.73	16.52	(250)	1731	281	5668	1449
12102	1965	0.26	3.44	68.52	27.78	(138)	896	47	2708	343
	1990	0.46	4.44	67.18	27.92	(138)	895	63	2784	689
12103	1965	0.14	4.32	84.16	11.38	(277)	1462	21	4552	818
	1990	0.29	5.66	84.37	9.68	(277)	1481	48	4714	1567
13000	1965	0	0.82	27.17	72.01	(102)	294	45	1038	83
	1990	0	1.05	26.79	72.16	(102)	298	54	1097	169

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PLATE VII-13

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
13001	1965	0.21	3.09	85.57	11.13	(83)	774	216	2792	222
	1990	0.34	4.51	83.49	11.66	(86)	703	248	2988	432
13110	1965	0.21	2.10	86.56	11.13	(26)	235	66	848	68
	1990	0.33	4.31	83.43	11.93	(26)	239	76	906	138
13120	1965	0.13	4.21	87.33	8.32	(176)	1567	488	5655	647
	1990	0.23	5.13	84.19	10.47	(176)	1588	543	5998	1216
13121	1965	0.04	2.02	14.28	83.66	(935)	573	170	2050	204
	1990	0.03	2.72	13.94	83.32	(935)	583	192	2184	395
13122	1965	0.12	3.72	86.52	9.64	(31)	279	83	999	100
	1990	0.33	4.77	83.83	11.10	(31)	284	93	1064	193

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PLATE VII-37

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
13123	1965	0.00	4.05	77.51	9.78	(109)	1554	140	4610	547
	1990	0.00	5.06	78.23	11.11	(155)	1555	176	4783	1018
13124	1965	0.86	3.51	78.23	11.40	(201)	1660	191	5030	617
	1990	7.07	5.51	76.41	11.01	(201)	1665	241	5266	1143
13130	1965	4.20	4.02	83.46	7.72	(272)	2378	530	7735	1050
	1990	4.19	5.47	80.17	10.17	(272)	2393	594	8101	1915
13131	1965	0.23	5.02	83.71	8.04	(129)	1120	378	3917	521
	1990	0.23	5.70	82.61	11.46	(129)	1132	411	4130	1043
13140	1965	0.18	2.20	47.31	49.31	(191)	824	473	3341	513
	1990	0.53	4.47	48.41	46.33	(192)	833	489	3511	885

PLATE XVI-28

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
13141	1965	2.52	3.15	79.90	15.43	(106)	1027	190	3290	454
	1990	3.24	6.65	79.34	10.77	(106)	1045	239	3527	804
13142	1965	1.11	3.11	50.10	40.68	(71)	285	620	2179	372
	1990	1.11	3.33	42.41	47.63	(71)	280	586	2175	647
13150	1965	0.73	5.60	80.16	13.49	(155)	1289	1125	6056	964
	1990	1.22	9.73	75.90	13.15	(103)	1282	1124	6290	1380
13151	1965	3.29	2.52	51.24	42.35	(317)	1211	1587	8280	4665
	1990	3.53	5.41	49.34	41.67	(317)	1250	1622	8446	6468
13160	1965	2.33	1.12	49.52	46.98	(337)	1370	1325	8267	5922
	1990	3.70	4.12	43.09	49.09	(337)	1489	1282	8578	8010

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PLATE XIII

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
14170	1965	0.20	2.30	41.72	55.78	(107)	414	246	1689	191
	1990	0.35	3.15	40.82	55.70	(107)	426	247	1783	366
14171	1965	0.63	1.04	29.01	19.49	(442)	3896	794	13717	1119
	1990	0.72	3.77	81.40	14.11	(442)	3946	936	14556	2270
14172	1965	0.40	4.10	74.40	21.10	(10)	69	41	282	32
	1990	0.60	5.00	72.50	21.90	(10)	71	41	297	61
14173	1965	0.20	3.50	62.10	32.40	(14)	82	48	333	38
	1990	0.50	4.79	61.43	32.28	(14)	84	49	352	72
14180	1965	0.56	4.10	74.43	21.15	(35)	838	348	2395	270
	1990	0.57	5.41	72.81	21.01	(35)	603	351	2529	510

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PLATE VII-40

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
14181	1965	0.23	2.03	47.77	49.97	(229)	1019	605	4155	469
	1990	0.37	3.60	46.74	49.29	(229)	1047	608	4386	900
14182	1965	0.31	3.56	65.72	30.41	(156)	930	606	3929	432
	1990	0.49	4.84	64.02	30.65	(156)	956	608	4145	834
16190	1965	0.43	5.82	52.77	40.98	(68)	249	423	1768	447
	1990	0.43	6.88	49.47	43.22	(68)	257	410	1836	675
16191	1965	0	2.72	42.39	54.89	(28)	80	85	452	123
	1990	0	3.64	41.20	55.16	(28)	83	79	461	189
16192	1965	0.11	3.15	52.37	44.39	(124)	509	417	2461	498
	1990	0.18	4.23	51.02	44.55	(124)	524	398	2547	811

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PLATE VI-41

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
16210	1965	0.35	3.86	84.61	11.10	(91)	587	727	3346	294
	1990	0.40	5.12	79.39	15.09	(91)	603	723	3506	606
16211	1965	0.26	3.15	78.15	23.44	(123)	625	1008	4151	327
	1990	0.26	3.94	67.36	28.44	(123)	640	1000	4338	698
18200	1965	1.26	11.80	72.86	14.36	(60)	312	739	2688	641
	1990	1.28	15.08	65.32	20.32	(60)	324	732	2832	960
18201	1965	0.60	6.14	85.60	8.26	(42)	250	450	1784	227
	1990	0.60	7.19	77.85	14.36	(42)	257	446	1868	401
18220	1965	1.39	11.78	72.54	14.36	(57)	298	702	2559	609
	1990	1.52	15.08	68.29	20.34	(57)	309	697	2694	914

PLATE VI-42

CITY & COUNTY OF SAN FRANCISCO

SEWERAGE SYSTEM

LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
18221	1965	0.65	6.65	83.85	8.80	(140)	827	1523	5986	823
	1990	0.66	7.72	76.73	14.89	(140)	849	1510	6273	1420
18230	1965	1.27	12.31	72.47	13.95	(301)	1358	3465	12457	4684
	1990	1.27	14.46	65.14	19.13	(301)	1380	3449	13016	7605
18231	1965	1.20	11.81	72.56	14.35	(49)	255	603	2194	523
	1990	1.26	13.03	65.32	20.32	(49)	264	597	2310	782
18240	1965	1.27	9.97	76.66	12.08	(74)	404	885	3329	626
	1990	1.30	11.45	68.05	19.20	(74)	412	868	3464	997
18241	1965	0.70	4.24	84.07	10.99	(145)	554	1059	4243	414
	1990	0.83	5.45	46.87	46.85	(145)	550	1022	4321	830

PLATE A1-43

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
10242	1965	0.23	1.24	15.75	82.78	(305)	340	651	2607	254
	1990	0.24	1.53	13.66	84.51	(305)	338	628	2654	510
10250	1965	0.98	12.83	54.37	32.17	(104)	357	1063	3443	3121
	1990	0.93	15.74	45.46	37.87	(104)	338	1081	3566	4226
10251	1965	0.29	9.45	62.97	27.35	(105)	526	1639	3677	1283
	1990	0.25	13.11	51.32	35.32	(105)	514	1597	3755	2177
10260	1965	1.01	5.49	69.87	23.62	(76)	375	717	2672	280
	1990	1.03	7.09	60.53	31.31	(76)	372	692	2914	562
	1965									
	1990									

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PLATE VII-49

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
BROTHERHOOD WAY	1965	0	0	0	100	(164)	0	0	0	0
	1990	0	0	0	100	(164)	0	0	0	0
OLYMPIC CLUB	1965	0	0	0	100	(136)	0	0	0	0
	1990	0	0	0	100	(136)	0	0	0	0
FORT FUNSTON	1965	0	0	0	100	(145)	0	0	0	0
	1990	0	0	0	100	(145)	0	0	0	0
HARDING PARK	1965	0	0	0	100	(175)	0	0	0	0
	1990	0	0	0	100	(175)	0	0	0	0
ZOO (SOUTH)	1965	0	0	0	100	(79)	0	0	0	0
	1990	0	0	0	100	(79)	0	0	0	0

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED

RICHMOND-SUNSET ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
ZOO (NORTH)	1965	0	0	0	100.00	(103)	0	0	0	0
	1990	0	0	0	100.00	(103)	0	0	0	0
FORT MILEY	1965	0	2.69	42.41	54.90	(85)	242	258	1374	375
	1990	0	3.64	41.20	55.16	(85)	251	299	1398	575
SEA CLIFF	1965	0	1.70	42.41	54.89	(98)	279	298	1584	432
	1990	0	3.64	41.21	55.15	(98)	289	275	1612	662
BAKER'S BEACH	1965	0	0.44	4.22	95.34	(214)	0	88	482	571
	1990	0	0.48	4.16	95.36	(214)	2	71	460	817
PRESIDIO (R.S.)	1965	0	0.44	4.22	95.34	(289)	0	115	630	743
	1990	0	0.48	4.16	95.36	(289)	3	92	602	1070

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PLATE VII-6

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
40000	1965	50.98	2.68	29.66	16.68	(220)	594	612	3887	2449
	1990	55.82	8.27	15.30	20.61	(220)	449	570	3472	3025
42000	1965	40.80	2.45	25.64	31.11	(145)	325	531	2198	1616
	1990	44.99	8.18	15.41	31.42	(145)	261	308	2022	2042
43000	1965	24.79	8.06	44.17	22.98	(502)	2068	2897	14943	6517
	1990	26.51	14.66	26.24	32.59	(502)	1628	3408	15465	8988
44000	1965	41.26	3.76	29.31	26.67	(324)	989	251	4364	4320
	1990	43.17	13.45	21.03	22.35	(324)	882	447	4370	5646
44001	1965	17.95	6.62	49.62	26.81	(200)	1079	650	5273	1739
	1990	21.45	13.83	30.33	34.39	(200)	901	790	5252	2536

PLATE VII-17

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
44002	1965	2.74	6.28	63.02	27.96	(436)	2640	1270	11968	1249
	1990	6.72	9.56	45.04	38.68	(436)	2269	1430	11517	2303
44560	1965	0.62	4.38	80.77	14.26	(98)	825	186	3128	709
	1990	1.20	7.62	67.27	23.91	(98)	768	241	3008	639
44561	1965	1.58	9.90	60.95	27.57	(47)	327	78	1174	225
	1990	2.13	18.15	54.96	24.76	(47)	319	88	1203	388
44562	1965	2.90	4.55	69.45	23.07	(50)	190	273	1369	217
	1990	6.76	6.60	48.60	38.04	(50)	159	258	1283	374
44570	1965	0.29	2.45	61.24	35.94	(227)	1213	921	5793	628
	1990	1.29	6.59	55.30	36.82	(227)	1165	1085	6484	1277

PLATE A1-48

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
44571	1965	1.14	4.19	65.02	29.66	(37)	25	271	835	234
	1990	1.33	6.16	61.18	31.33	(37)	27	229	767	346
44580	1965	0.34	0.81	53.15	45.70	(300)	1855	963	6136	391
	1990	1.21	5.64	50.27	34.88	(300)	1432	1298	5124	1216
44590	1965	1.25	5.63	64.01	29.11	(40)	90	236	927	238
	1990	1.53	9.18	59.61	29.68	(40)	90	204	878	363
44591	1965	1.14	1.90	61.02	35.94	(429)	2383	798	9133	1203
	1990	1.61	4.70	58.92	34.77	(429)	2368	848	9438	2553
44600	1965	1.94	3.51	75.99	18.56	(187)	1568	239	5691	1307
	1990	2.45	6.54	63.75	27.26	(187)	1470	356	5494	1106

PLATE VII-49

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
44601	1965	0.59	5.33	77.83	16.25	(120)	1010	157	3566	743
	1990	1.13	8.94	68.63	21.25	(120)	969	232	3566	765
44602	1965	1.63	10.51	60.45	27.41	(8)	62	8	202	37
	1990	2.25	19.50	54.25	24.00	(8)	60	11	209	65
44610	1965	0.69	8.37	64.58	26.16	(47)	318	54	1085	159
	1990	1.45	13.75	62.74	22.06	(47)	321	75	1174	303
44611	1965	0.51	7.23	66.69	25.52	(300)	1887	372	6585	828
	1990	1.08	10.73	67.20	21.04	(300)	1941	516	7311	1671
44612	1965	1.69	10.61	60.46	27.33	(10)	77	10	253	46
	1990	2.30	19.62	54.26	23.92	(10)	75	14	262	81

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PLATE VII-50

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
44620	1965	0.53	7.17	66.65	25.65	(17)	107	21	374	47
	1990	1.00	10.72	67.24	21.04	(17)	110	29	414	95
44621	1965	0.84	7.01	67.48	24.67	(356)	2575	380	8852	1157
	1990	1.56	12.64	64.88	20.92	(356)	2583	575	9598	2217
44700	1965	1.07	6.83	68.12	23.98	(160)	1268	150	4320	576
	1990	1.95	14.00	63.27	20.78	(160)	1252	247	4618	1372
44701	1965	1.15	4.17	65.02	29.66	(40)	27	293	903	253
	1990	1.33	6.15	61.19	31.33	(40)	29	248	829	374
44710	1965	1.37	8.86	63.94	25.81	(188)	1468	181	4897	781
	1990	2.10	17.05	58.32	22.53	(188)	1440	272	5149	1407

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PLATE A4-5I

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
44711	1965	0.75	4.94	64.56	29.75	(142)	906	288	3548	549
	1990	1.35	9.66	59.41	29.58	(142)	888	323	3674	1016
45000	1965	47.27	3.52	22.70	26.51	(66)	163	43	690	991
	1990	48.23	14.53	18.56	18.68	(66)	152	62	715	1275
46000	1965	28.16	2.33	19.67	49.84	(57)	94	76	624	675
	1990	30.98	9.14	16.10	43.78	(57)	89	73	623	800
48000	1965	29.07	2.32	19.66	49.95	(278)	459	570	3042	3209
	1990	30.00	9.11	16.09	44.80	(278)	432	358	3039	4218
51680	1965	10.96	1.25	16.95	70.84	(79)	73	153	899	705
	1990	15.86	4.29	13.29	66.56	(79)	70	126	870	944

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PLATE NO. 3

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
51681	1965	10.96	1.35	16.95	70.84	(103)	95	200	1172	919
	1990	15.26	4.29	18.09	66.36	(103)	92	165	1134	1231
52630	1965	21.50	1.58	22.33	54.59	(237)	488	124	1874	1450
	1990	38.07	8.16	21.42	32.35	(237)	829	157	1992	2355
52631	1965	48.59	5.56	24.64	19.21	(220)	561	160	2386	3003
	1990	44.95	13.35	20.41	20.79	(220)	523	221	2468	3904
52632	1965	11.87	1.11	17.54	69.78	(38)	98	60	323	256
	1990	29.21	4.63	15.26	50.90	(38)	33	51	276	409
52640	1965	0.42	1.26	62.00	29.62	(13)	69	30	300	34
	1990	1.77	12.15	51.51	34.77	(13)	68	35	301	44

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PLATE VI-53

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
52641	1965	7.20	4.40	56.56	31.84	(97)	541	127	2162	324
	1990	8.15	9.31	54.75	27.79	(97)	540	169	2323	554
52642	1965	1.79	6.61	61.30	30.30	(62)	339	126	1434	160
	1990	2.71	11.26	53.17	32.86	(62)	319	151	1469	302
52650	1965	9.13	1.19	27.79	61.90	(260)	472	220	2683	201
	1990	9.58	2.89	27.61	59.92	(260)	489	237	2844	459
52651	1965	8.92	4.69	51.75	34.60	(120)	537	199	2341	305
	1990	4.63	8.10	44.55	42.72	(120)	503	235	2355	472
54000	1965	11.27	1.65	29.76	57.30	(256)	646	164	2644	772
	1990	29.75	6.90	29.63	33.82	(256)	649	207	2849	1693

PLATE VII-54

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
54660	1965	3.25	4.86	61.41	30.18	(196)	1205	265	4740	498
	1990	4.84	9.19	60.12	25.85	(196)	1209	360	5116	955
54661	1965	2.93	5.33	60.61	31.08	(313)	1826	395	6918	774
	1990	3.74	9.25	60.13	26.88	(313)	1854	535	7547	1527
54662	1965	3.93	1.26	29.15	60.61	(176)	357	149	1921	149
	1990	9.43	3.08	29.13	58.34	(176)	367	164	2046	333
	1965									
	1990									
	1965									
	1990									

PLATE VI-55

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
CENTRAL BASIN (NORTH)	1965	50.97	2.68	29.66	16.69	(6)	16	17	106	67
	1990	55.52	8.27	15.30	20.61	(6)	12	16	95	83
CENTRAL BASIN (SOUTH)	1965	50.97	2.68	29.66	16.69	(45)	122	125	795	501
	1990	55.52	8.27	15.30	20.61	(45)	92	117	710	619
ISLAIS CREEK (NORTH)	1965	25.40	2.07	21.29	48.24	(134)	225	252	1706	1441
	1990	32.13	7.41	15.22	45.24	(134)	197	229	1628	1967
ISLAIS CREEK (SOUTH)	1965	10.96	1.25	16.95	70.84	(200)	258	543	3186	2493
	1990	15.26	4.29	13.69	66.56	(200)	249	448	3083	3346
OUTFALL NO. 44	1965	47.27	3.52	22.71	26.50	(8)	20	5	84	121
	1990	48.23	14.55	13.56	13.66	(8)	18	7	87	155

PLATE VI-15

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NON-MONITORED

SOUTHEAST ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
OUTFALL NO. 45	1965	47.27	3.52	22.71	26.50	(6)	15	4	63	91
	1990	40.23	14.53	18.56	18.68	(6)	14	6	65	116
HUNTER'S PT. (NORTH)	1965	10.96	1.35	16.95	70.84	(309)	398	755	4427	3470
	1990	15.26	4.29	13.89	66.56	(309)	346	622	4283	4649
HUNTER'S PT. (SOUTH)	1965	10.96	1.35	16.95	70.84	(359)	330	696	4095	3202
	1990	15.26	4.29	13.89	66.56	(359)	320	574	5953	4290
CANDLESTICK PARK	1965	10.96	1.35	16.95	70.84	(350)	322	679	3983	3122
	1990	15.26	4.29	13.89	66.56	(350)	312	560	3854	4183
NORTH SAN MATEO #10	1965	NOT A PART OF S.F. LAND AREA. HOWEVER, 12.22 ACRES OF THIS AREA IS CONTRIBUTING TO THE CITY'S SEWER SYSTEM.								
	1990									

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PLATE W1-57

CALCULATION PROCEDURES

In obtaining the calculation results tabulated on Plate VI, the following steps were followed. Essentially, the figures were derived from BASS IV's basic data with the demographic area boundaries related to the 1960 census tract boundaries. A specific area within S. F. sewerage system, shown on Plate VII-3 will be used to illustrate these calculation steps. The area in consideration contains four watersheds (watershed #'s 22280, 22281, 22290, 22291) with a monitor (#220) installed to measure the total flow. The census tract boundaries for the same area in consideration are shown on Plate VII-4.

Step #1: Overlaying Plate VII-3 over Plate VII-4, it can be seen that each watershed will consist of a combination of different census tract areas. Each watershed with its corresponding census tract composition is recorded in an appropriate work sheet shown on Plate VII-5 (Col. 2 for watershed and Col. 3 for census tract composition).

Step #2: The corresponding demographic area code for each census tract is determined and recorded in Col. 4 of Plate VII-5. (See Plate IV for this relationship between the 1960 census tracts and BASS IV demographic area for this determination.)

Step #3: Using a planimeter, the census tract area in acres contained in each watershed is determined and recorded in Col. 5 of Plate VII-5.

Step #4: Determine present and projected land use distribution (acres), housing (no. of units), population (no. of persons), and employment (no. of persons) for each demographic area and record in appropriate column 6 through 25 of Plate VII-5. This is done by multiplying the acreage (Col. 5 of Plate VII-5) by the factors tabulated in Plate V corresponding to the demographic area (Col. 4 of Plate VII-5).

Step #5: Present and projected land use distribution, housing, population, and employment for each watershed is determined by summation of demographic area figures contained thereof as determined in previous steps.

Step #6: Present and projected land use distribution, housing, population, and employment for the monitored area, therefore, will be the summation of the watershed figures determined in Step #5.

Step #7: Resultant figures determined in Step #5 and Step #6 are recorded in appropriate forms shown in Plate VII-6 and VII-7 respectively. Note that figures on Cols. 12 through 17 of Plate VII-5 were combined under the heading "Public Lands and All Others" on Plate VII-6 and VII-7.

Step #8: Present and projected land use distributions in acres shown in Plate VII-6 and VII-7 are converted into percentage of gross area and recorded into an appropriate form as shown on Plate VII-8 and VII-9 respectively.

Step #9: Plate VI shows the tabulation of figures determined in Step #8 for the entire San Francisco.

SAN FRANCISCO SEWERAGE SYSTEM

TYPICAL WATERSHED BOUNDARIES

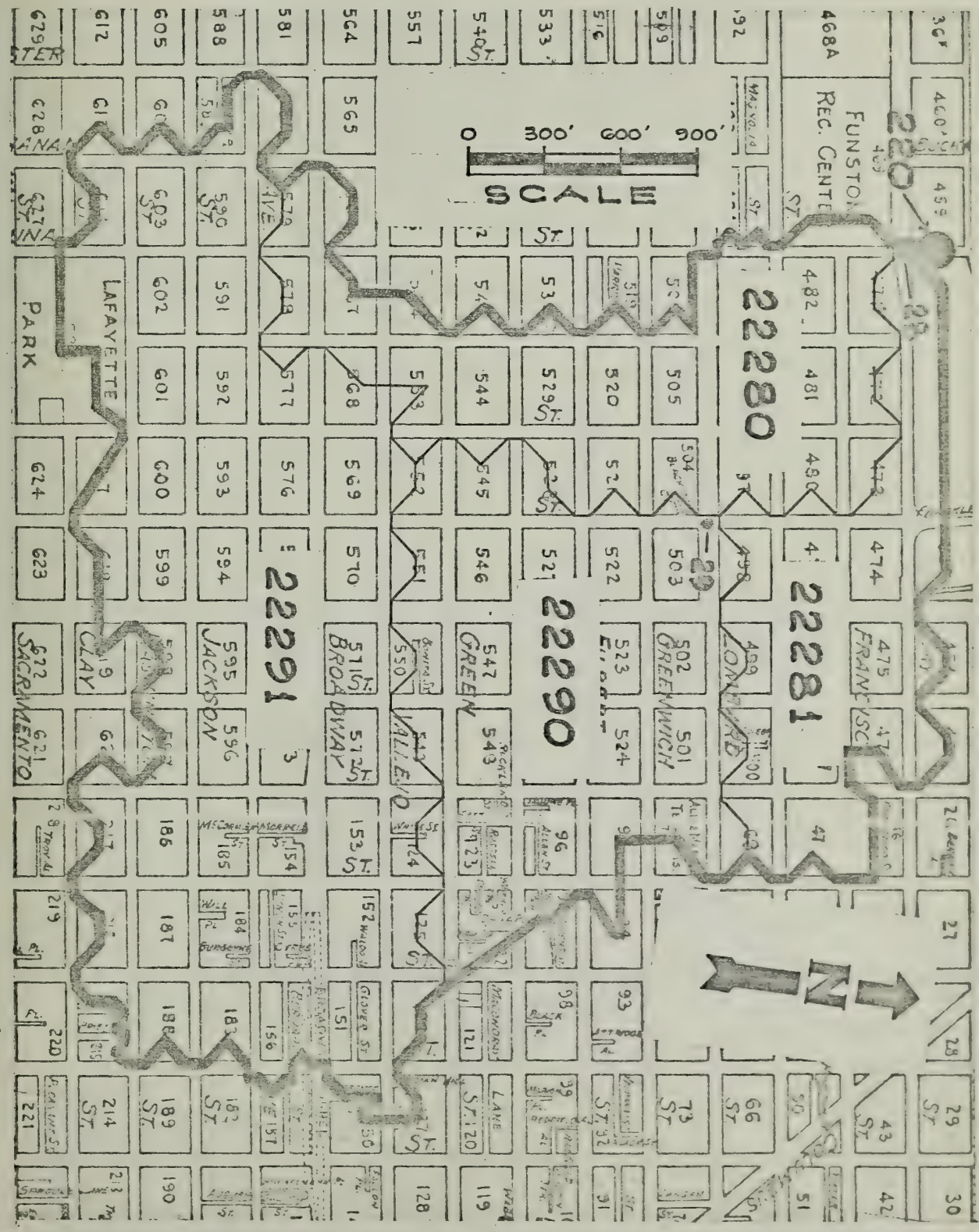
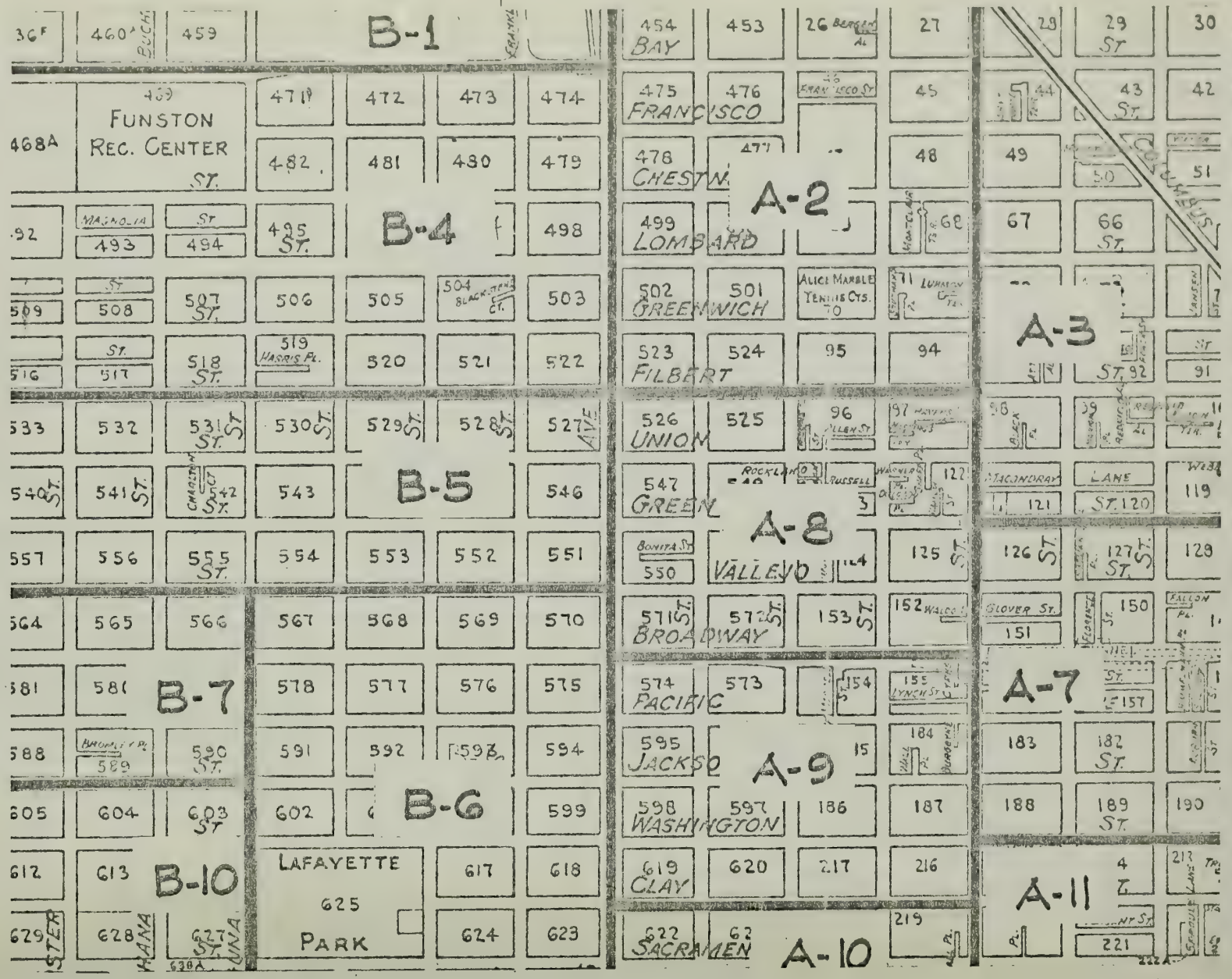


PLATE VIII-4

1960 CENSUS TRACTS



MONITOR NUMBER	WATERSHED NUMBER	1960 CENSUS TRACT	BASS IV'S DEMOGRAPHIC AREA	AREA IN ACRES	LAND USE DISTRIBUTION (ACRES)												HOUSING DENSITY				POPULATION (NO. OF PERSONS)		EMPLOYMENT (NO. OF EMPLOYED)	
					INDUSTRIES AND MANUFACTURING		COMMERCIAL, UTILITIES, & TRANSPORTATION		RESIDENTIAL		PARKS and RECREATIONAL		INSTITUTIONS AND PUBLIC LANDS		VACANT LAND (USABLE & UNUSABLE)		SINGLE FAMILY (NO. OF UNITS)		MULTI-FAMILY (NO. OF UNITS)					
					1965	1990	1965	1990	1965	1990	1965	1990	1965	1990	1965	1990	1965	1990	1965	1990	1965	1990	1965	1990
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		B-4	18	43	0.65	0.65	3.58	4.23	29.64	24.79	0	0	8.80	13.33	0.33	0	96.75	81.72	876.77	833.12	2162.90	2162.68	349.59	646.07
		B-5	19	15	0.33	0.33	2.97	3.30	10.88	9.68	0	0	0.49	2.30	0.33	0	31.65	28.50	321.30	360.15	814.35	846.90	165.49	313.60
		B-6	20	6	0	0	0.40	0.67	4.18	3.48	0	0	1.08	1.93	0.34	0	12.18	10.56	212.10	226.68	407.28	456.12	42.20	153.36
		B-7	21	3	0	0.02	0	0.18	2.62	2.40	0	0	0.21	0.39	0.11	0	15.51	15.06	21.39	28.05	109.14	111.72	25.68	41.37
	22280	—	—	67	0.98	1.00	6.65	8.38	47.32	39.75	0	0	10.64	17.87	1.11	0	157	142	1408	1477	3524	3597	623	1176
		A-2	2	13	1.83	2.13	0.82	1.10	6.37	5.31	0.82	0.82	2.88	3.04	0.87	0	28.21	23.27	189.02	216.65	372.84	419.90	114.53	200.17
		D-1	15	10	0.11	0.11	0.25	0.32	2.67	2.24	0.47	0.94	3.76	4.26	2.74	2.12	14.80	14.50	93.20	88.60	220.90	197.90	270.30	384.51
		B-4	18	21	0.32	0.32	1.78	2.07	14.48	12.11	0	0	4.30	6.51	0.16	0	47.23	42.84	428.19	416.64	1056.30	1063.56	170.73	325.29
	22281	—	—	44	2.26	2.56	2.52	3.49	23.52	19.66	0.99	1.46	10.94	14.71	3.77	2.12	90	81	710	711	1630	1684	556	920
		A-2	2	24	3.38	3.93	0.96	2.03	11.76	9.81	0.96	0.96	5.32	7.26	1.61	0	52.08	42.96	348.96	380.40	688.32	773.20	211.14	369.36
		A-8	6	32	2.13	2.15	5.92	6.43	21.24	14.57	0	0	1.61	7.82	1.08	1.62	81.60	60.16	1083.84	1162.40	2475.84	3009.00	660.48	1041.28
		B-4	18	9	0.14	0.14	0.75	0.90	6.20	5.19	0	0	1.63	2.79	0.67	0	20.25	16.56	193.51	173.56	452.70	456.84	73.17	139.41
		B-5	19	16	0.35	0.35	3.16	3.51	11.60	9.60	0	0	0.53	2.45	0.36	0	33.76	30.40	406.72	393.76	900.64	903.56	176.48	336.64
	22290	—	—	81	6.02	6.57	10.70	12.87	80.80	30.26	0.96	0.96	9.31	20.32	5.12	1.02	188	152	2023	2135	4718	5135	1122	1687
		A-7	7	18	0.29	0.41	1.17	2.19	14.63	10.32	0	0	1.17	5.07	0.73	0	58.10	61.56	550.80	682.74	1320.40	1857.06	235.26	411.48
		A-8	6	24	1.61	1.61	4.44	4.82	15.93	10.93	0	0	1.21	5.87	0.81	0.77	61.20	45.12	812.93	886.80	2006.88	2250.00	405.36	787.86
		A-9	6	46	3.09	3.09	8.51	9.24	30.54	20.93	0	0	2.31	11.23	1.55	1.47	117.30	86.48	1556.02	1689.70	3846.52	4312.50	949.44	1436.83
		B-5	19	3	0.07	0.07	0.59	0.66	2.18	1.82	0	0	0.10	0.24	0.07	0	6.33	5.70	76.26	73.83	168.37	169.36	33.09	63.12
		B-6	20	60	0	0	4.04	6.74	41.90	34.78	0	0	10.80	18.48	3.37	0	121.80	105.60	2121.60	2266.80	4672.80	4561.20	832.60	1533.60
		B-7	21	7	0	0.06	0	0.41	6.12	5.60	0	0.01	0.62	0.92	0.24	0	36.10	33.14	63.01	65.45	254.66	260.68	59.92	93.53
		B-10	23	7	0.14	0.18	0.62	0.96	4.04	3.57	0	0	1.10	1.93	0.29	0	17.22	15.26	163.91	167.37	366.45	378.84	105.70	181.84
	22291	—	—	165	5.20	5.42	19.37	25.02	116.04	88.27	0	0.01	17.31	44.04	7.08	2.24	440	355	5332	5843	12237	13700	2701	4546
220	—	—	—	357	14.46	15.55	39.63	49.76	287.68	186.91	1.95	2.43	118.20	233.01	15.09	5.38	875	730	9383	10166	22100	24206	5002	8527

PLATE VII-5

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
22280	1965	0.93	6.96	47.32	11.75	(67)	157	1498	3524	623
	1990	1.65	8.58	39.75	17.07	(67)	142	1477	3397	1176
22281	1965	2.26	2.52	23.52	15.70	(44)	90	710	1630	556
	1990	2.56	3.49	19.66	18.23	(44)	81	711	1684	920
22290	1965	6.52	10.79	50.66	13.39	(81)	188	2023	4718	1122
	1990	6.57	12.87	39.26	22.30	(81)	152	2135	5135	1807
22291	1965	5.20	19.37	116.64	24.29	(165)	440	5352	12257	2701
	1990	5.42	26.93	88.27	46.29	(165)	355	5843	13790	4544
	1965									
	1990									

PLATE VIII-6

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
220	1965	14.46	39.63	237.68	65.23	(357)	675	9583	22109	5[illegible]72
	1990	15.55	49.76	180.94	104.75	(357)	730	10166	24206	8[illegible]27
	1965									
	1990									
	1965									
	1990									
	1965									
	1990									
	1965									
	1990									

PLATE VIII-7

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

WATERSHED NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
22280	1965	1.46	10.37	70.65	17.54	(67)	137	1498	3524	1223
	1990	1.49	12.51	59.33	26.67	(67)	142	1497	3597	1176
22281	1965	5.14	5.73	53.45	35.68	(44)	90	710	1630	536
	1990	5.82	7.93	44.68	41.57	(44)	81	711	1684	920
22290	1965	1.45	15.82	62.72	16.53	(81)	188	2023	4715	1122
	1990	8.11	15.89	48.47	27.53	(81)	152	2135	5135	1587
22291	1965	3.19	11.74	70.35	14.78	(165)	440	5352	12237	2701
	1990	3.28	15.16	53.53	28.02	(165)	355	5943	13790	4544
	1965									
	1990									

PLATE VIII-B

CITY & COUNTY OF SAN FRANCISCO
SEWERAGE SYSTEM
LAND USE DISTRIBUTION, HOUSING, POPULATION, & EMPLOYMENT

NORTH POINT ZONE

MONITOR NUMBER	YEAR	LAND USE (% OF GROSS AREA)				GROSS AREA (ACRES)	HOUSING		POPULATION (NO. OF PERSONS)	EMPLOYMENT (NO. OF PERSONS)
		INDUSTRIES & MANUFACTURING	COMMERCIAL TRANSPORTATION AND UTILITIES	RESIDENTIAL	PUBLIC LANDS AND ALL OTHERS		SINGLE FAMILY (NO. OF UNITS)	MULTI-FAMILY (NO. OF UNITS)		
220	1965	4.05	11.10	66.58	18.27	(357)	875	9583	22109	5202
	1990	4.36	13.94	52.30	29.34	(357)	730	10166	24206	8517
	1965									
	1990									
	1965									
	1990									
	1965									
	1990									
	1965									
	1990									

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PLATE VIII-9

SEWERAGE SYSTEM

FLOW PROJECTIONS

SAN FRANCISCO SEWERAGE SYSTEM

FLOW PROJECTIONS

As part of the development of the Master Plan it was necessary to develop influent-effluent flow projections for each of the City's water pollution control plants to the year 2020 to provide a fifty year planning base. Basic data utilized included the City's effluent flow records from the treatment plants, Water Department gross water consumption data, and projections, Department of City Planning population data and projections, and the population projections of the Bay-Area Simulation Study performed for the Bay-Delta Study.

Method of Analysis

The baseline data used for the projections are shown on Table 1. Table 2 tabulates projections used in the development of the effluent rates. Figure 1 was developed to estimate the expected City's average dry weather day effluent flows and population for the future planning. The City's three water pollution control plants average dry weather day effluent flow in "gpcd" rates was plotted for a 10-year period, 1960 to 1970 per Table 1, and then projected to the year 2020 utilizing a best fit curve. The average gross water consumptions in MGD for a 50-year

1970-2020 was obtained from a San Francisco Water Department engineering consultant, Brown and Caldwell (B&C) per Table 2. B&C conducted a study during 1971 to predict the water demands for the San Francisco and Bay Area as a whole. The City's future population to the year 1990 was obtained from City Planning Department at which year their prediction terminated. The population for the period from 1990 to 2020 was calculated from B&C supplied data for Water Department, by dividing the total flow, MGD by average usage rate "gpcd" to obtain population.

Utilizing the population figures from City Planning and B&C and multiplying by the gpcd rates as developed on Figure 1, the total City effluent flow in MGD was obtained.

Individual plant projections were developed by projecting past data for each plant consistent with the total City projections. Table 3 tabulates the City based data and compares it to BASS IV data. For the purposes of planning the City Planning and Water Department based projections were used. These are shown graphically on Figure 2 and DSE Drawing 71-542.

TABLE 1

PLANT DATA 1960 - 1970

YEAR	WPCP EFFLUENT MGD NP	RS	SE	TOTAL	WATER DEPT. GROSS WATER DEMAND MGD	CITY PLANNING POPULATION	WPCP GPCD	S.F. W.D. GPCD
1960	44.8	15.7	15.8	76.3	92	740316	103	124
1961	45.2	16.1	16.9	78.2	90	737616	103	122
1962	45.2	16.7	14.8	76.7	89	734916	104	121
1963	47.5	17.5	17.9	82.9	91	732216	112	124
1964	52.2	17.7	18.3	88.2	97.5	729516	121	134
1965	15.9	18.5	18.3	88.7	97.0	727196	122	134
1966	54.7	19.0	18.8	92.5	97.5	723996	128	135
1967	57.1	19.8	18.0	94.9	---	720796	132	---
1968	61.4	20.8	18.5	100.7	---	718096	142	---
1969	59.4	18.8	18.9	97.1	---	714896	136	---
1970	58.93	20.20	20.0	99.13	111	711276	139	156

The above data was utilized in the development of Figure:1.

TABLE 2

YEAR	W.D.AVERAGE DAILY WATER DEMAND PER 1971 B&C MGD	CITY PLANNING POPULATION	W.D. "GPCD"	DSE WPCP'S GPCD EFF. (3)	TOTAL WPCP'S EFFLUENT MGD (4)
1970	111.0	711276	156	140	100
1975	109	703712	155	147	104
1980	119	710050	168	156	111
1990	125	755572	166	153	115
2000	128	760000(2)	168(1)	155	118
2010	131	770000(2)	170(1)	158	122
2020	134	780000(2)	172(1)	160	125

(1) Water Department consumptive rate gallons per capita per day "GPCD" was plotted utilizing a method of best fit and projected from 1990 to 2020. See Figure 1.

(2) Calculated by dividing the Water Department's Gross average daily water demand by gpcd rates.

(3) An effluent consumptive rate curve gallon per capita per day "gpcd" was developed by utilizing a 7% differential from water demand gpcd rates. See Figure 1.

(4) WPCP's total effluent flow in MGD was computed by multiplying the City Planning's population by the WPCP "gpcd" rates. See Figure 1.

WATER POLLUTION CONTROL PLANT POPULATION EQUIVALENTS

Plant	Year	Resident Population	Residential Loading in (lbs/Day) (1) BOD	(2) SS	Actual Plant Data in (Lbs/Day) BOD	SS	Equivalent Populations in Term of BOD	SS
N.P. WPCP	1965	347,700	62,500	69,500	126,100	89,000	700,700	445,500
	1970	340,000	61,500	68,000	124,500(3)	87,500(4)	690,000	437,800
	1990	361,600	65,000	72,000	132,100	92,500	733,600	463,600
	2000	363,000	65,500	72,500	133,000	93,000	738,000	465,000
	2020	373,000	67,000	74,500	137,000	96,000	763,000	480,500
R-S WPCP	1965	216,300	32,800	43,200	32,000	54,900	216,300	274,800
	1970	211,600	31,500(5)	42,000	31,500(5)	53,700(6)	211,600	270,100
	1990	224,000	33,400	44,700	33,400	57,000	224,000	285,500
	2000	225,500	34,600	45,400	33,600	59,200	225,500	289,500
	2020	231,000	34,400	46,000	34,400	58,500	231,000	293,500
S.E. WPCP	1965	163,200	28,400	32,500	44,900	69,000	255,200	346,200
	1970	159,700	28,600	31,700	43,800(7)	67,400(8)	244,700	338,700
	1990	170,000	30,600	34,000	46,700	71,800	259,000	359,000
	2000	171,500	30,800	34,350	47,100	72,200	262,000	361,500
	2020	176,000	31,600	35,200	48,500	74,000	270,000	370,000

Following factor was utilized in computation of the above table:

(1) BOD = 0.18 lbs/cap/day PER LITERATURE "BROOKS"
(2) SS = 0.20 "
(3) BOD = 0.3675 "
(4) SS = 0.2565 "
(5) BOD = 0.149 "
(6) SS = 0.254 "
(7) BOD = 0.275 "
(8) SS = 0.452 "

NOTE:
R-S Plant BOD of 0.149 < BOD of 0.18 which has been established by laboratory test: The BOD of 0.149 was used to estimate the plant equivalent populations.

TABLE 3

YEAR	NPWPCP (3) "gpcd" Rates	NPWPCP City (1) Planning Populat'n Project'n	NPWPCP Ave. D.W. Eff. Flow MGD	NPWPCP BASS IV (2) Populat'n Project'n	NPWPCP Ave. D.W. Eff. Flow MGD	RSWPCP (3) "gpcd" Rates	RSWPCP City (1) Planning Populat'n Project'n	RSWPCP Ave. D.W. Eff. Flow MGD	RSWPCP BASS IV (2) Populat'n Project'n	RSWPCP Ave. D.W. Eff. Flow MGD	SEWPCP (3) "gpcd" Rates	SEWPCP City (1) Planning Populat'n Project'n	SEWPCP Ave. D.W. Eff. Flow MGD	SEWPCP BASS IV (2) Populat'n Project'n	SEWPCP Ave. D.W. Eff. Flow MGD	Total Plant Effluent MGD UTILIZING (1)	Total Plant Effluent MGD UTILIZING (2)
1965	149	347,700	52	354,400	53	86	216,300	19	220,000	20	112	163,200	18	166,000	19	89	92
1970	173	340,000	59	363,000	64	96	211,600	20	225,000	21	125	159,700	20	172,000	22	99	107
1990	194	361,600	70	400,000	77	101	224,000	23	249,000	25	129	170,000	22	190,000	25	115	127
2000	195	363,000	71	419,000	82	107	225,500	24	261,000	28	134	171,500	23	200,000	27	118	137
2020	198	373,000	74	471,000	93	117	231,000	27	294,000	35	136	176,000	24	225,000	31	125	159

(1) Per City Planning Data Projection

(2) S.F. Bay Delta Simulation Study (BASS IV) Projection; Populations for the years 2000 and 2020 of BASS III were adjusted per BASS IV.

(3) Calculated by D.S.E. based upon the City-wide gpcd rate shown in Table 3.

TABLE 4

FIGURE 1

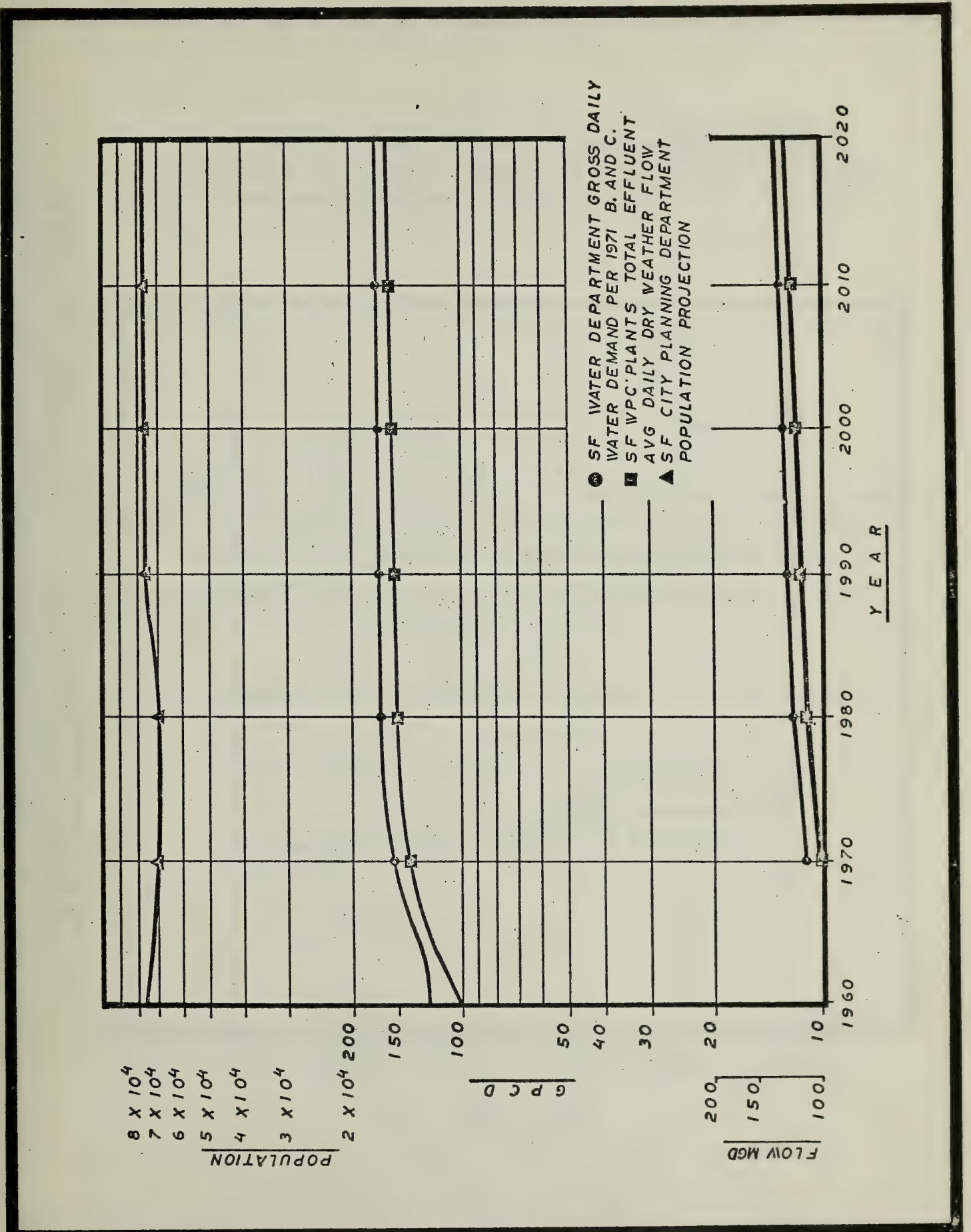
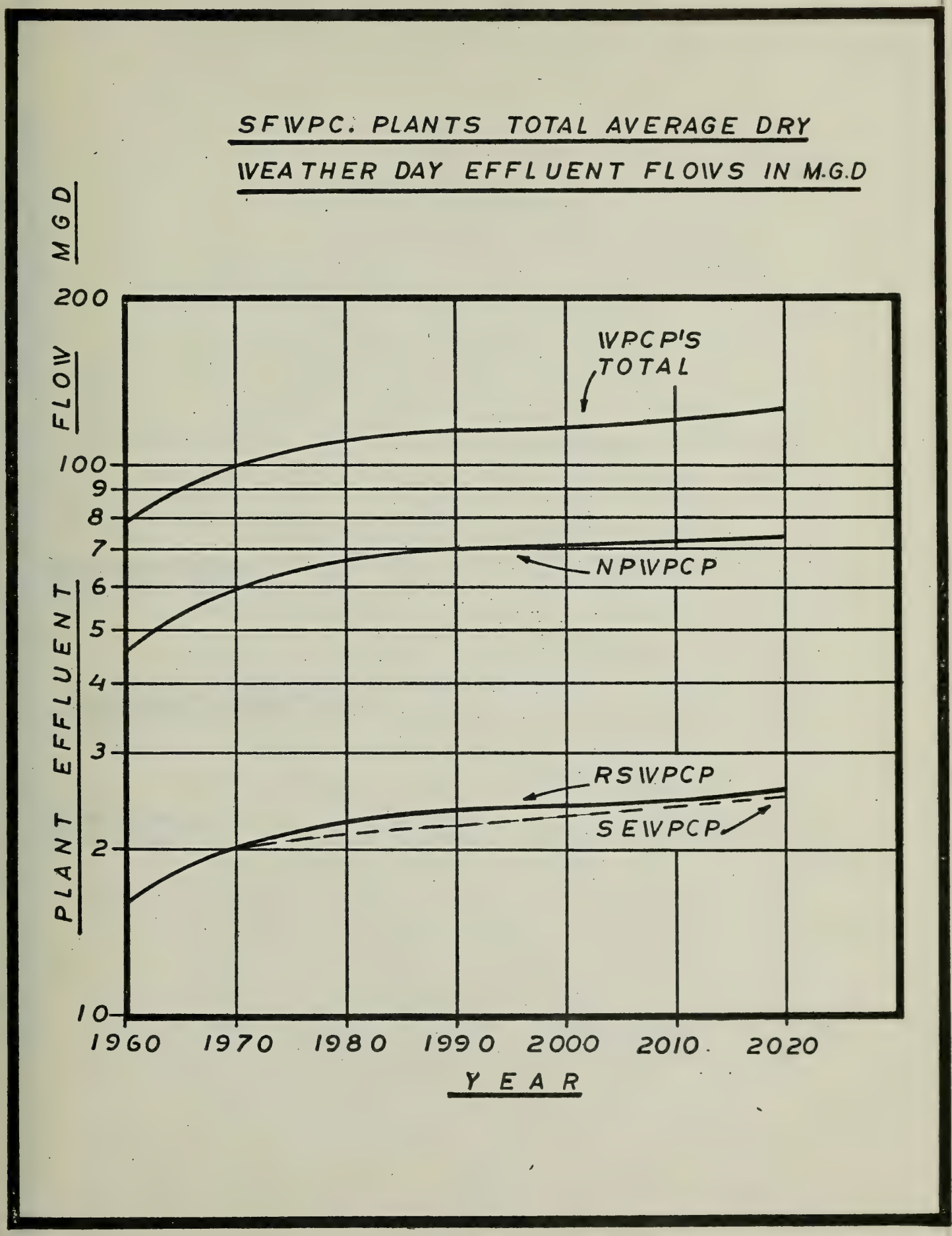

SF WATER DEPARTMENT GROSS DAILY WATER DEMAND PER 1971 B. AND C.
SF WPC PLANTS TOTAL EFFLUENT AVG DAILY DRY WEATHER FLOW
SF CITY PLANNING DEPARTMENT POPULATION PROJECTION
YEAR
1960
1970
1980
1990
2000
2010
2020
GPCD
50
40
30
20
10
100
150
200
FLOW MGD
2 X 10^4
3 X 10^4
4 X 10^4
5 X 10^4
6 X 10^4
7 X 10^4
8 X 10^4
POPULATION

FIGURE 2


SFWPC. PLANTS TOTAL AVERAGE DRY
WEATHER DAY EFFLUENT FLOWS IN M.G.D
PLANT EFFLUENT FLOW MGD
200
100
9
8
7
6
5
4
3
2
10
WPCP'S TOTAL
NPWPCP
RSWPCP
SEWPCP
1960
1970
1980
1990
2000
2010
2020
YEAR

SEWER

INADEQUACY

STUDY

CITY AND COUNTY OF SAN FRANCISCO

SEWER INADEQUACY STUDY

I. INTRODUCTION

The sewer inadequacy study was undertaken to serve as a guideline for the development of a viable master plan. The objective of the study is to determine the degree of adequacy of the sewer lines in the City of San Francisco, thereby, showing the weak points (inadequate sewers) as well as strong points (adequate sewers) within the City's existing sewer system. These results will enable the engineer to have a general view of the deficiencies of the existing system and, therefore, will enable him to plan alternate solutions for the relief of the inadequate sewer lines.

It is important to note that efforts have been concentrated towards the investigation of major collectors only and it has been assumed that any sewer having at least one dimension equal to or greater than three feet is considered to be a major collector. Smaller sewer lines have been excluded in this study for the very obvious reason that small size sewers (as opposed to the ones designated as major

collectors) do not discharge directly into the bay and, therefore, should not be of primary concern.

II. APPROACH

A. THEORETICAL APPROACH

The general approach used in this study is that of calculating the percentage of adequacy existing in any particular sewer line. The percentage of adequacy is the ratio of the existing capacity of the line to the calculated run-off multiplied by 100.

1. Existing Capacity: QE

The existing capacity is calculated based on the physical characteristics of the sewer line, namely, cross-sectional shape, its dimensions, and the slope of the energy grade line. Based on Kutter's formula:

$$QE = AV = Ac\sqrt{rs}$$

and,
$$c = \frac{\frac{1.811}{n} + 41.65 + \frac{0.00281}{s}}{1 + \frac{n}{r}\left(41.65 + \frac{0.00281}{s}\right)}$$

where: QE = existing capacity

A = cross-sectional area of conduit

V = mean velocity

c = frictional loss coefficient

n = roughness coefficient

s = slope of the energy grade line

r = hydraulic radius

2. Run-Off, QR

The calculated run-off is obtained by the rational method based on the formula:

$$QR = CiA$$

where: QR = run-off

C = run-off coefficient

i = average rainfall intensity

A = drainage area

3. Percentage of Adequacy

The percentage of adequacy is the ratio of the existing capacity of the sewer line to the calculated run-off multiplied by 100. Thus:

$$\text{Percentage Adequacy (\%)} = \frac{QE}{QR} \times 100$$

Therefore, the sewer line is considered to be adequate when QE/QR is greater than or equal to 1 and inadequate when QE/QR is less than 1.

B. PRACTICAL APPROACH

1. Determination of the Existing Capacity

For the purpose of this study, the roughness coefficient (n) in Kutter's formula, as discussed under the theoretical approach, shall be taken as equal to 0.013. This roughness coefficient is for concrete, a material which most of the major sewer lines are made of. The same coefficient has been used also for brick sewers and lines made of other materials. This approximation is considered to be valid in as much that the roughness coefficient (n) varies slowly from one material to another, as can be seen from Plate 69 on page 76. It varies from 0.012 to 0.018 for concrete, from 0.11 to 0.017 for brick sewers, from 0.011 to 0.017 for clay, and from 0.00001 for a very smooth material to 0.05 to a very rough material.

The existing capacities are obtained from charts drawn by A. A. Brown and A. C. Toll as shown in Plates 64, 65, 66, and 67. Their drawings are based on Kutter's formula and are used for 3 different cross-sectional shape sewers, namely, circular, flat top egg shaped, and egg shaped sewers.

For practical purposes, the slope of the energy grade line is calculated from official street grades. For flat areas, the slope is calculated on the basis of assuming the hydraulic grade line at the outfall (elevation = -3.5 ft.) with a constant gradient to the control elevation at the upstream end of the sewer under consideration.

2. Determination of the Run-off

The calculated run-offs are usually extracted from previous hydraulic computations on file at D.S.E. However, some of the run-offs are not available and were determined by the rational method based on the formula QR = CiA,

where: QR = run-off

C = run-off coefficient (given on a drainage district map of 1946 revised from Sept. 1937)

i = rainfall intensity (determined by using the 1941 5-year frequency design curve)

A = drainage area (determined by using a planimeter when the scale is known, or by extrapolation from known tributary areas of nodes and outfalls)

Some of the run-offs extracted from previous hydraulic calculations on file show discrepancies but these are the

only direct source of information on run-offs available and, therefore, were assumed to be adequate for estimation purposes.

3. Data Collections

The following data was compiled for each major sewer line (Plates 1 to 51 show a complete tabulation of these data):

a) street

b) cross-street

c) high energy grade

d) low energy grade

e) fall

f) length

g) slope = fall/length

h) existing size

i) existing capacity

j) tributary area

k) run-off

l) percentage of adequacy

m) required size

n) comments

o) estimated correction cost

The street grades are obtained from drainage district maps with official grades of April 18, 1939. The size and shape are obtained from City section maps of 1968. These section maps also indicate reference drawings.

The lengths are usually tabulated along with the run-offs from previous hydraulic calculations but when they are not available, they may be scaled off from the section maps. Once the slope and size are determined, they are used as entries to Toll & Brown's charts to obtain the existing capacity. Using the run-offs and the slope as entries on the same charts, the required sizes of replacement sewers can be determined.

The percentage of adequacy are computed to the nearest 0.5%. Plate 68 on page 75 shows the locations of the adequate and inadequate sewers in San Francisco based upon the results of this study.

SEWER INADEQUACY SUMMARY —— TRANSPORT SYSTEM

OUTFALL NO.	DIST. NO.	TOTAL MILES SEWER INVES.	TOTAL MILES INAD. SEWER	TOTAL COST MILLION $	MILES SEWER 99-85% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 85-70% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 70-55% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 55-40% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 40% ADEQ.	COST TO CORRECT MILLION $
11	Outfall	0.55	0.55	2.750			0.55	2.750						
	110	1.62	0.79	1.805	0.18	0.225	0.61	1.580						
	112	2.10	1.53	1.047	0.72	-	0.54	0.554	0.04	0.057	0.23	0.436	-	-
	113	1.30	0.56	0.557	-	-	0.11	0.113	0.13	0.121	0.20	0.204	0.12	0.119
	114	1.96	0.70	0.202			0.10	0.088					0.60	0.114
Outfall Total		7.53	4.13	6.361	0.90	0.225	1.91	5.085	0.17	0.178	0.43	0.640	0.72	0.233
12	121	0.25	0.27	0.436	0.06	0.049	0.07	0.069	0.08	0.220	0.06	0.098		
	123	0.65	0.34	0.457	0.18	0.149	-	-	-	-	0.06	0.198	.10	.110
	124	2.64	2.37	2.776	0.17	0.145	0.36	0.284	0.85	0.960	0.61	0.747	0.38	0.640
	125	2.52	1.67	1.720	0.23	0.223	0.44	0.419	0.30	0.325	0.11	0.135	0.59	0.618
	126	1.10	0.95	0.943	-	-	0.35	0.306	0.18	0.176	0.30	0.335	0.12	0.126
Outfall Total		7.16	5.60	6.332	0.64	0.566	1.22	1.078	1.41	1.681	1.14	1.513	1.19	1.494
13	130,131, & 880	0.62	0.12	0.356	-	-	0.12	0.356	-	-	-	-	-	-
	132	1.30	1.21	1.187	-	-	0.52	0.499	-	-	0.23	0.220	0.46	0.468
	134 & 135	5.78	3.17	3.014	0.45	0.210	0.62	0.547	0.88	0.863	1.10	1.279	0.12	0.115
	136	2.53	1.45	1.196	0.06	0.037	0.06	0.039	0.69	0.675	0.25	0.258	0.39	0.187
	137 & 138	3.04	1.53	1.531			0.48	0.491	0.12	0.129	0.67	0.556	0.26	0.355
	139	0.85	0.57	0.492	0.10	0.071	-	-	0.06	0.056	0.22	0.176	0.19	0.189
Outfall Total		14.12	8.05	7.776	0.61	0.318	1.80	1.932	1.75	1.723	2.47	2.489	1.42	1.314
14	140	0.12	0	-	-	-	-	-	-	-	-	-	-	-
	142	1.63	1.21	1.123	0.23	0.168	0.25	0.189	0.31	0.297	0.29	0.339	0.13	0.130
	144	2.40	1.94	1.820	0.57	0.166	0.52	0.655	0.55	0.808	0.30	0.191	-	-
Outfall Total		4.15	3.15	2.943	0.80	0.334	0.77	0.844	0.86	1.105	0.59	0.530	0.13	0.130
16	161	3.45	1.74	1.517	0.35	0.281	0.19	0.167	0.71	0.575	0.49	0.494	-	-
Outfall Total		3.45	1.74	1.517	0.35	0.281	0.19	0.167	0.71	0.575	0.49	0.494	-	-

PLATE I

SEWER INADEQUACY SUMMARY —— TRANSPORT SYSTEM

OUTFALL NO.	DIST. NO.	TOTAL MILES SEWER INVES..	TOTAL MILES INAD. SEWER	TOTAL COST MILLION $	MILES SEWER 99-85% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 85-70% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 70-55% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 55-40% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 40% ADEQ.	COST TO CORRECT MILLION $
18	Outfall	0.91	0.45	0.567	-	-	0.08	0.115	-	-	0.37	0.452	-	-
	181 & 182	2.93	1.40	1.052	0.62	0.363	0.60	0.485	0.12	0.148	-	-	0.06	0.056
	183	2.97	0.93	1.028	0.23	0.183	0.31	0.301	0.07	0.058	-	-	0.32	0.486
Outfall Total		6.81	2.78	2.647	0.85	0.546	0.99	0.901	0.19	0.206	0.37	0.452	0.38	0.542
20	Outfall	0.47	0.32	0.367	-	-	0.32	0.367	-	-	-	-	-	-
	200	0.87	0.23	0.169	-	-	0.07	0.045	0.16	0.124	-	-	-	-
Outfall Total		1.34	0.55	0.536	-	-	0.39	0.412	0.16	0.124	-	-	-	-
21	Outfall & 210	2.52	1.47	1.770	0.15	0.189	0.28	0.324	0.32	0.386	0.66	0.811	0.06	0.060
Outfall Total		2.52	1.47	1.770	0.15	0.189	0.28	0.324	0.32	0.386	0.66	0.811	0.06	0.060
22	Outfall & 220	3.0	0.29	.278	0.16	0.136	0.13	0.142	-	-	-	-	-	-
Outfall Total		3.0	0.29	.278	0.16	0.136	0.13	0.142	-	-	-	-	-	-
24	241	1.96	1.04	2.022	0.12	0.214	0.13	0.144	0.16	0.163	0.35	0.762	0.28	0.739
Outfall Total		1.96	1.04	2.022	0.12	0.214	0.13	0.144	0.16	0.163	0.35	0.762	0.28	0.739
29		2.05	.79	1.159	-	-	.33	.439	.29	.428	-	-	.17	.251
Outfall Total		2.05	.79	1.159	-	-	.33	.439	.29	.428	-	-	.17	.292
39		0.22	-	-	-	-	-	-	-	-	-	-	-	-
Outfall Total		0.22	-	-	-	-	-	-	-	-	-	-	0.43	0.791
39		0.43	0.43	0.791	-	-	-	-	-	-	-	-	0.43	0.791
Outfall Total		0.43	0.43	0.791	-	-	-	-	-					
40		1.30	0.93	1.241	-	-	0.14	0.213	0.50	0.652	0.24	0.323	0.05	0.053
Outfall Total		1.30	0.93	1.241	-	-	0.14	0.213	0.50	0.652	0.24	0.323	0.05	0.053

PLATE 2

SEWER INADEQUACY SUMMARY—— TRANSPORT SYSTEM

OUTFALL NO.	DIST. NO.	TOTAL MILES SEWER INVES.	TOTAL MILES INAD. SEWER	TOTAL COST MILLION $	MILES SEWER 99-85% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 85-70% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 70-55% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 55-40% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 40% ADEQ.	COST TO CORRECT MILLION $
42		1.02	0.35	0.595	-	-	0.09	0.125	0.09	0.130	0.08	0.135	0.09	0.205
Outfall Total		1.02	0.35	0.595	-	-	0.09	0.125	0.09	0.130	0.08	0.135	0.09	0.205
43	430	1.86	1.08	3.144	-	-	0.18	0.195	0.59	0.833	0.31	2.116	-	-
	432	2.55	0.62	0.602	0.06	0.065	0.41	0.376	0.06	0.074	0.09	0.087	-	-
Outfall Total		4.41	1.70	3.746	0.06	0.065	0.59	0.571	0.65	0.907	0.40	2.203	-	-
44	440	2.54	2.07	13.349	0.23	0.204	-	-	1.17	12.219	0.26	0.280	0.41	0.637
	441	1.54	0.59	3.590	-	-	0.02	0.019	0.05	0.114	0.52	3.457	-	-
	442	3.05	1.15	1.147	0.10	0.120	0.33	0.317	0.68	0.668	0.04	0.042	-	-
	443	0.78	0.18	0.223	0.05	0.049	.09	.133	-	-	0.04	0.041	-	-
	444	2.07	1.29	1.263	0.30	0.252	0.49	0.491	0.39	0.404	0.11	0.116	-	-
	445	2.15	1.05	1.066	0.17	0.163	0.49	0.472	0.14	0.156	0.17	0.184	0.08	0.091
	446	1.24	1.16	1.189	0.05	0.035	0.15	0.104	-	-	-	-	0.96	1.050
	447	1.31	-	-	-	-	-	-	-	-	-	-	-	-
	448	1.50	0.06	0.064	-	-	0.06	0.064	-	-	-	-	-	-
Outfall Total		16.18	7.55	21.882	0.90	0.823	1.63	1.600	2.43	13.561	1.14	4.120	1.45	1.778
45		0.10	-	-	-	-	-	-	-	-	-	-	-	-
Outfall Total		0.10	-	-	-	-	-	-	-	-	-	-	-	-
46		0.35	0.16	0.275	-	-	-	-	0.06	0.080	-	-	0.10	0.195
Outfall Total		0.35	0.16	0.275	-	-	-	-	0.06	0.080	-	-	0.10	0.195
48		1.62	0.11	0.113	-	-	0.11	0.113	-	-	-	-	-	-
Outfall Total		1.62	0.11	0.113	-	-	0.11	0.113	-	-	-	-	-	-
49		0.02	-	-	-	-	-	-	-	-	-	-	-	-
Outfall Total		0.02	-	-	-	-	-	-	-	-	-	-	-	-
51		1.33	0.35	0.436	0.10	0.125	0.25	0.311	-	-	-	-	-	-
Outfall Total		1.33	0.35	0.436	0.10	0.125	0.25	0.311	-	-	-	-	-	-

SEWER INADEQUACY SUMMARY — TRANSPORT SYSTEM

OUTFALL NO.	DIST. NO.	TOTAL MILES SEWER INVES.	TOTAL MILES INAD. SEWER	TOTAL COST MILLION $	MILES SEWER 99-85% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 85-70% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 70-55% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 55-40% ADEQ.	COST TO CORRECT MILLION $	MILES SEWER 40% ADEQ.	COST TO CORRECT MILLION $
52	521	0.40	0.36	1.055	-	-	-	-	0.25	0.750	0.11	0.305	-	-
	522	1.47	0.96	1.461	-	-	0.30	0.440	0.13	0.189	0.36	0.569	0.17	0.263
	523	0.94	0.94	1.276	0.16	0.150	-	-	0.52	0.679	0.13	0.173	0.13	0.274
	524	1.43	1.43	1.364	-	-	0.19	0.149	0.28	0.265	0.36	0.358	0.60	0.592
Outfall Total		4.24	3.69	5.156	0.16	0.150	0.49	0.589	1.18	1.883	0.96	1.405	0.90	1.129
53 Outfall Total		0.62	0.25	0.340	0.17	0.240	0.08	0.100	-	-	-	-	-	-
		0.62	0.25	0.340	0.17	0.240	0.08	0.100	-	-	-	-	-	-
54 Outfall Total		2.96	1.23	1.141	0.24	0.184	0.40	0.356	0.42	0.413	0.17	0.188	-	-
		2.96	1.23	1.141	0.24	0.184	0.40	0.356	0.42	0.413	0.17	0.188	-	-
Interconnected system	352	2.71	-	-	-	-	-	-	-	-	-	-	-	-
See notes 2 & 3	363	2.93	0.93	1.272	-	-	0.21	0.322	0.51	0.713	0.21	0.237	-	-
	372	1.52												
	374	6.30	0.69	0.724	0.42	0.451	-	-	0.27	0.273	-	-	-	-
	770	3.75	2.69	2.786	0.46	0.244	0.53	0.514	1.15	1.316	0.31	0.436	0.24	0.276
*Interconnected System Partial		17.21	4.31	4.782	0.88	0.695	0.74	0.836	1.93	2.302	0.52	0.673	0.24	0.276
Grand Total		106.48	51.20	75.803	7.04	5.091	12.66	16.282	13.26	26.497	10.63	18.702	7.61	9.231

Notes:

1. Outfalls 15, 17, 23, 25, 31, 32, 33, 41, 50 are minor outlets with minor flow.
2. Outfalls 26, 27, 28, 30, 34, 35, 36 & 37 are part of the interconnected system which will be the subject of a separate special study.
3. Outfalls 35, 36, 37 - A review was made of only the upstream districts of these outfalls which are part of the interconnected system.
4. Outfall 47 is presently sealed.

PLATE 4

OUTFALL NO. 11

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Outfall District	Outfall	Transition Structure at John Muir Dr.	T	10.30	16.10	5.8	2921	.002	10'x11'-3"	990	1541	1380	72	153"	A-96"	2750.0
DISTRICT 110																
	Transition Strct. at John Muir Dr.	Lake Merced Blvd So. of Brotherhood	13	16.10	22.50	6.4	3191	.002	3 comp 6'-9"	1040	1541	1380	75	153"	A-93"	1586.0
	Lake Merced Blvd. So. of Brotherhood	Brotherhood	10	22.50	24.40	1.9	943	.002	3 comp.6'-9"	1040	1325	1180	88	144"	A-63"	225.0
DISTRICT 112	Brotherhood	Junction (control) at State College		24.40	32.7	8.3	3803	.002	10'x11'-3"	990	1212	1031	96	138"		
Gellert Drive	Junction (control) State College	End 45" sewer & State College	10	32.7	41.3	8.6	352	.025	45"ø	160	277	355	45	57"	A-45"	69.0
	End 45" sewer State College	End 66" sewer (nr.Middlefield)	10	41.3	51	9.7	1962	.005	66"ø	250	96	332	75	75"	A-45"	385.0
	End 66" Sewer (nr.Middlefield)	End 48" Sewer (nr.Everglade)	8	51	53.5	2.5	912	.0027	48"ø	75	20	89	84	51"	A-27"	169.2
	End 48" Sewer (nr.Everglade)	Morningside Dr.	9	53.5	55.9	2.4	893	.0027	36"ø	36	21	67	54	48"	A-36"	196.2
5'-10" Storm Drain	Junction (at SF State)	250' E of Junction	10	32.7	35	2.3	250	.0092	5'-10"	380	726	640	59	84"	A-60"	57.3
	250' E of Junct'n	1000' East of Junction	11	35	40	5	750	.0062	5'-10"	300	726	640	47	93	A-72"	171.0
	1000' E of Junctn	19th Ave. (W)		40	140	100	637	.16	"	1500	685	630	240			
Easement & Lyndhurst Dr.	19th Ave. (W)	Junipero Serra		140	155	15	820	.018	54"& 60"	640	675	630	102			
DISTRICT 113																
Brotherhood 63"ø Reach	Junction with 10'x11'-3"tunnel	End of 5'-3" reach S.E. of Garces Drive		26.66	70	43.34	1872	.0234	63"	460	290	414	112			
51"ø Reach	End 63"Reach (S.E.Garces Dr.)	Begin 66"Reach (West of Thomas Moore Way)		70	125	55	864	.064	51"	440	290	410	107			
66"ø Reach	End 63" Reach (W.of Thomas Moore Way)	Thomas Moore Way		125	157	32	668	.048	66"	750	290	410	183			
Brotherhood 4'x4'-9" Reach	Thomas Moore Way	Chester	8	157	173.2	16.2	586	.028	4'x4'-9"	330	273	400	82	60"	A-30"	113
Brotherhood	Chester	St.Charles	9	173.2	186.8	13.6	488	.028	3'x4'-6"	200	244	364	55	57"	A-42"	88.1
Brotherhood	St. Charles	Vernon	9	186.8	197.8	11	392	.028	2'-6"x3'-9"	120	180	272	44	51"	A-39"	68.2
	Vernon	Arch	9	197.8	205	7.2	260	.028	"	"	157	240	50	48"	A-39"	45.2
	Arch	Ramsell	8	205	212.2	7.2	260	.028	"	"	145	224	53	48"	A-36"	56.3
	Ramsell	Victoria	9	212.2	219.4	7.2	260	.028	2'x3'	68	126	198	34	45"	A-39"	45.3
	Victoria	Head	8	219.4	228.9	9.5	340	.028	"	68	114	180	38	45"	A-36"	73.6
Easement	Head	Bright	8	228.9	233.9	5	180	.028	"	68	84	133	51	39"	A-30"	34.8
	Bright	Orizaba	8	233.9	238.9	5	180	.028	"	68	73	116	59	36"	A-27"	33.5
Orizaba	No. of Sadowa	Sagamore		238.9	252	13.1	463	.028	"	68	37	63	108			

PLATE 5

OUTFALL NO. 11

DISTRICT NO. 110

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Lake Merced Bl.	Junction with Tunnel S. of Brotherhood	Brotherhood Way	10	22.50	36.0	14	370	.02	60"	380	190	186	205			
	Brotherhood Way	270' North	10	36.0	53	17	270	.064	60"	650	190	186	350			
	270' North	Garces Dr.		53	68	15	360	.042	54"	400		186				
Vidal	Garces Dr.	Higuera	15	68	75	7	630	.011	3'-6"x5'-3"	170	132	136	215			
Higuera	Vidal	Arballo	15	75	100	25	370	.068	2'-6"x3'-3"	180	74	79	230			
Arballo	Higuera	Serrano	9	100	103	3	207	.014	"	80	67	73	110			
Serrano	Arballo	Font	9	103	116	13	863	.015	"	80	64	72	110			
Font	Serrano	Juan Bautista Circle	6	116	130	14	412	.034	2'x3'	70	51	62	112			
Vidal	Higuera	Acevedo		75	76	1	425	.0024	3'-0"x4'-6"	54	54	57	100			
	Acevedo	Arballo Dr.		76	78	4	560	.0035	2'-6"x3'-9"	43	23	29	148			

PLATE 6

OUTFALL NO. 11

DISTRICT NO. 114

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Easement	Monitor (N of J.P.Serra)	Lunado		155	180	25	612	.041	72"	880	676	610	145			
	Lunado	40' E of Lunado		180	200	20	40	.5	72"&3'x4'-6"	1500	604	575	242			
	40' E of Lunado	Urbano		200	205	5	130	.036	"	950	548	521	182			
	Urbano	Borica		205	209.6	4.6	230	.02	3'x4'-6"	175	163.6	174	100			
	Borica	Corona		209.6	215.4	5.8	290	"	"	"	159	166	105			
	Corona	De Soto		215.4	221.2	5.8	290	"	"	"	151	160	109			
	De Soto	Victoria		221.2	227	5.8	290	"	"	"	143	155	113			
	Victoria	Urbano		227	231.6	4.6	230	"	"	"	135.7	149	118			
	Urbano	Ashton		231.6	237	5.4	290	.057	3'x4'-6"+54"	700	282	305	240		3'x4'-6" on Pico	
Ashton	Easement	Ocean		237	238	1	200	.005	"	700	256	305	240			
Ocean	Ashton	Jules	9	238	239.5	1.5	200	.0075	2'-6"x3'-9"+54"	240	256	305	79	69"	A-39"	34.8
	Jules	Faxon		239.5	245.5	6	305	.0196	"	374	239	287	130			
	Faxon	Capitol		245.5	253	7.5	305	.0245	"	415	225	271	153			
	Capitol	Miramar		253	260	7	305	.023	"	402	205	248	163			
	Miramar	Granada	9	260	266	6	345	.018	2'x3'	50	155	186	27	48"	A-39"	60.0
	Granada	Plymouth	8	266	274.5	8.5	305	.028	"	62	141	170	36	42"	A-36"	65.0
	Plymouth	Brighton	8	274.5	282.5	6	305	.019	"	50	124	149	33	42"	A-36"	65.0
	Brighton	Lee	9	282.5	286.5	4	305	.013	"	42	112	135	31	45"	A-39"	53.0
	Lee	Harold	7	286.5	289	2.5	305	.0082	3'x4'-6"	100	99	122	82	48"	A-24"	54.0
	Harold	Phelan		289		2.5	200	.0116	"	120	85	108	110			
Phelan	Ocean	Judson	8	291.5	313.5	21.5	1900	.0116	30"	42	82	108	39	42"	A-36"	411.0
N. Urbano	Junction (at Easement)	Moncada		205	211	6	468	.0128	63"	350	373	361	97			
	Moncada	Corona		211	220.1	9.1	713	"	69"	400	313.6	323	124			
	Corona	Victoria		220.1	227.7	7.6	594	"	69"	400	308	323	124			
	Victoria	Junction (3'x4'-6")		227.7	231.6	3.9	303	"	63"	350	253	274	128			
S. Urbano	Junction with N. Urbano	Alviso		205	211.3	6.3	526	.012	3'x4'-6"	128	46.4	53.5	240			
	Alviso	Borica		211.3	214.1	2.8	234	.012	"	128	42	48.5	263			

PLATE 7

OUTFALL NO. 12

DISTRICT NO. 120 & 121

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Vicente	Outfall	48th Ave.	11	6.75	12.5	5.75	431	.0136	2 (60"Ø)	640	1549	1155	56	(2) 78"	A-72"	220.0
	48th Ave.	47th Ave.	12	12.5	15.2	2.70	292	.0093	78" Ø	520	1528	1129	46	(2) 81"	A-84	97.8
	47th Ave.	45th	9	15.2	23.5	8.30	344	.024	78	840	1523	1129	74	(2) 69"	A-54	69.8
	46th Ave.	45th	8	23.5	33.5	10	293	.034	78	980	1523	1129	87	61"	A-39	49.3
District 123	45th	44th	8	33.5	44.5	11	310	.035	78	1000	1522	1129	89	81"	A-36	53.6
	44th	43rd	12	44.5	49.5	5	310	.016	78	550	1368	1129	49	93"	A-72	88.4
	43rd	42nd		49.5	58	8.5	380	.022	78 + 84	1780	1363	1123	158			
	42nd	41st		58	61	3	240	.0126	"	1340	1359	1080	124			
	41st	40th		61	63	2	310	.0065	"	960	1352	1080	126			
	40th	39th		63	65	2	310	.0065	"	960	1342	1080	125			
	39th	38th		65	68	3	310	.0097	"	1190	1324	1073	111			
	38th	37th	c	68	73.5	5.5	320	.0172	"	1060	1314	1073	98	108"	A-21"	42.4
	37th	Sunset		73.5	74	3.5	180	.019	"	1650	1254	1027	159			
	Sunset	36th		74	76	5.5	120	.046	72	920	730	582	158			
	36th	35th		76	81	5	310	.016	72	580	715	574	116			
	35th	34th	8	81	85	4	310	.013	72	500	700	569	88	75"	A-36"	53.6
Outfall No. 12 District No. 124																
Sunset	Vicente	1st Grade Break	9	75	85.7	10.7	400	.0267	57	380	524	524	73	66"	A-39"	69.6
	1st Gr. Break	2nd " "	11	85.7	90.7	5	60	.0083	69	350	522	524	67	81"	A-39"	159.2
	2nd Grade Break	Yorba	11	90.7	92.5	1.8	430	.0042	60	170	517	524	32	90"	A-78"	134.6
36th Ave.	Yorba & Sunset	Sloat	8	92.5	100.5	8	238	.033	60	480	516	524	92	63"	A-27"	442
Sloat	36th Ave.	35th	11	100.5	105	5	661	.0075	69	340	516	524	65	81"	A-57"	143.0
	35th	Springfield	14	105	107	2	1023	.0019	72	190	490	524	36	105"	A-90"	399.0
	Springfield	Meadowbrook	9	107	130.8	23.8	955	.025	3'-6"x5'-3"	260	487	524	50	66"	A-51"	191.0
	Meadowbrook	Gabilan	9	130.8	162.8	32	87	.037	"	320	484	524	62	63"	A-42"	152.0
	Gabilan	Sloat & 23rd Av.	12	162.8	170	7.2	240	.030	"	290	484	524	55	84"	A-75"	71.0
Easement	Sloat & 23rd		11	170	180	10	1615	.0061	63	240	473	524	46	90"	A-69"	429.0
			10	180	185	5	59	.0084	63	285	457	518	55	72"	A-60"	136.0
			9	185	204	19	460	.041	3'x4'-6"	240	449	513	47	66"	A-48"	87.6
			8	204	217	13	164	.079	"	340	444	509	67	54"	A-36"	27.6
	So. P.L. Wawona	So. P.L. Wawona	9	217	229	12	415	.029	"	200	434	503	39	63"	A-54"	78.4
		15th Ave.& Wawona	10	229	258	29	167	.174	"	500	434	500	100			
Wawona	15th Ave.	14th Ave.	9	258	284	26	474	.055	"	280	419	491	57	57"	A-42"	82.9
	14th Ave.	Vicente	8	284	313	29	760	.038	"	230	291	348	66	51"	A-33"	129.6
	Vicente	Grade Break	8	313	330	17	277	.061	"	300	291	348	86	48"	A-24"	50.2
	Grade Break	Ulloa	9	330	336	6	316	.019	"	165	290	343	84	57"	A-48"	62.2
Ulloa	Wawona	Lenox Way	8	336	340	4	145	.027	"	200	258	317	63	51"	A-36"	58.6
	Lenox	Tunnel R/W	9	340	343	3	200	.015	"	145	258	315	46	60"	A-48"	39.4
	Tunnel R/W	Claremont	9	343	346	3	141	.021	2'-6"x3'-9"	105	251	311	34	75"	A-48"	27.8
	Claremont	Dorchester	8	346	373	27	689	.039	"	245	168	213	115	42"	A-21"	91.2
	Dorchester	Allston	8	373	390	17	254	.067	"	190	164	209	91	42"	A-18"	32.6
	Allston	Granville	8	390	404	14	251	.056	"	170	157	201	84	39"	A-21"	33.2
	Granville	Kensington	9	404	432	28	325	.086	"	210	147	191	110			
Kensington Way	Ulloa	Portola	8	432	465	33	350	.094	2'x3'	140	130	169	83	36"	A-18"	44.9
Portola	Kensington	Rex	9	[illegible]	[illegible]	31	575	.054	"	94	90	119	79	33"	A-18"	73.8
	Rex	Waithman	8	[illegible]	[illegible]	25	410	.061	"	98	82	111	88	33"	A-15"	50.8

OUTFALL NO. 12

DISTRICT NO. 125

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Vicente	34th Avenue	33rd Avenue		85	98	13	310	.042	3'x4'-6"+45"	490	329	394	124			
	33rd	32nd	8	98	106	8	310	.026	3'x4'-6"+36"	300	270	328	92	54"	A-24"	56.2
	32nd	31st	8	106	120	14	310	.045	3'x4'-6"	235	266	327	72	51	A-33"	64.0
34th Avenue	Vicente	Escolta	9	85	86.4	1.4	240	.0058	63"	240	365	313	77	72	A-42"	42.0
	Escolta	Wawona	9	86.4	89	2.6	440	"	"	240	315	313	77	72	A-42"	77.0
	Wawona	Sloat	9	89	95	6	1040	"	"	240	283	313	77	72	A-42"	182.0
Sloat	34th	Springfield	8	95	103.5	8.5	924	.0092	"	290	282	313	93	66	A-24"	167.0
Springfield	Sloat	Ocean	10	103.5	106	2.5	612	.0041	60"	170	278	313	54	75	A-57"	135.2
Ocean	Springfield	Riverton	9	106	107.4	1.4	255	.0055	"	200	276	313	64	72	A-48"	50.2
	Riverton	Middlefield	10	107.4	108.7	1.3	255	.0051	"	190	270	313	61	72	A-51"	52.7
	Middlefield	Sylvan	10	108.7	110	1.3	255	.0051	"	190	265	313	61	72	A-51"	52.7
	Sylvan	Meadowbrook	10	110	111.1	1.1	235	.0047	"	180	261	313	56	75	A-54"	48.5
Meadowbrook	Ocean	Eucalyptus	10	111.1	113.4	2.3	453	.0051	"	190	254	313	61	72	A-51"	93.0
Eucalyptus	Meadowbrook	Forestview	9	113.4	115.3	1.9	276	.0069	"	220	252	313	70	69	A-48"	54.4
	Forestview	Inverness		115.3	120.1	4.8	255	.019	"	370	245	304	122			
	Inverness	26th Avenue		120.1	126	5.9	255	.023	48" +2'x3'	300	237	300	100			
	26th	25th		126	137.2	11.2	255	.044	"	378	229	293	130			
	25th	24th		137.2	146.4	9.2	255	.036	"	350	222	285	123			
	24th	23rd		146.4	155.7	9.3	255	.036	"	350	214	277	126			
	23rd	Melba		155.7	165	9.3	255	.036	"	350	205	268	130			
	Melba	22nd		165	)	)	)	)	"	328	194	257	129			
	22nd	21st			177)	) 12	) 350	) .034	2'x3'+45"	308	194	257	120			
	21st	20th		177	187	10	255	.039	"	324	186	248	130			
	20th	19th		187	198	11	300	.037	"	322	176	238	135			
	19th	Junipero Serra		198	238	5	981	.051	"	364	140	138	265			
Junipero Serra Front road	Eucalyptus	Darien	8	243	248	5	300	.0166	2'x3'	48	97	138	35	42	A-39"	51.0
	Darien	Monterey	8	248	255	7	450	.0155	"	46	85	123	36	42	A-39"	76.5
Wawona Easement	Junction at 34th Avenue (Sta 0+81.42)	Junction at 33rd Avenue (Sta. 3+ 74.70)	8	85	86	1	293.28	.0041	"	23	63	72	31	45	A-39"	49.7
	33rd Ave. MH B (Sta 3+74.70)	MH "C" St. 5+63.98	8	86	87	1	189.28	.0041	"	23	52	67	34	42	A-36"	40.8
	MH "C" at Station 5+63.98	30th Ave. (Sta. 14+67.2)	8	87	100.94	3.94	903.29	.0043	"	24	52	67	35	42	A-36"	195.1
	30th Ave. (Sta. 14+67.27)	28th Ave. (Sta. 24+68.03)	10	100.94	102	1.06	1000.76	.001	"	12	41	61	20	54	A-51"	205.0
	28th Ave.	150'w. of MH on 26th Ave.		102	104.1	2.1	323.3	.0064	39"	84	32	53	159			
	150'w. of MH on 26th Ave.	MH on 26th Ave.	8	104.1	105	0.9	150	.0064	2'x3'	30	32	53	57	36	A-27"	27.8
	26th Ave.	M.H.		105	121.4	16.8	176	.096	27"	98	30	50	196			
	M.H.	25th Ave.		121.4	138	16.2	167.2	.096	24"	70	30	50	140			

OUTFALL NO. 12

DISTRICT NO. 126

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Vicente	31st Ave.	30th Ave.	8	120	135	15	310	.048	3'x4'-6"	240	250	302	80	48"	A-27"	57.5
	30th	29th	8	135	151	16	310	.051	"	250	222	298	84	48	A-24"	56.1
	29th	28th	8	151	167	16	310	.051	"	250	217	296	84	48	A-24"	56.1
	28th	27th	10	167	170	3	310	.0097	"	110	213	294	37	63	A-54"	64.50
	27th	26th	8	170	180	10	310	.032	2'-6"x3'-9"	120	171	239	50	48	A-36"	67.2
	26th	25th	8	180	195	15	310	.048	"	150	166	236	63	45	A-30"	60.0
	25th	24th	8	195	210	15	310	.048	"	150	162	231	65	42	A-30"	60.0
	24th	23rd	8	210	220	10	310	.032	"	120	159	228	53	45	A-36"	67.2
	23rd	22nd	8	220	232	12	310	.039	"	132	126	185	72	42	A-27"	57.5
22nd Ave.	Vicente	Ulloa	8	232	252	10	680	.015	2'-6"x3'-9"	82	132	191	43	54	A-33"	141.0
	Ulloa	Taraval		252	301	49	680	.072	"	180	95	140	128			
Taraval	22nd Ave.	21st	10	301	302	1	310	.0032	2'-6"x3'-3"	32	89	134	24	54	A-51"	61.4
	21st	20th	8	302	311	9	310	.029	2'x3'	64	84	129	50	36	A-30"	60
	20th	19th	8	311	328	17	310	.055	"	76	79	122	62	33	A-24"	56.1
	19th	18th	7	328	346	18	310	.058	"	90	75	112	80	33	A-18"	39.1
	18th	17th	7	346	360	14	310	.045	"	78	71	110	72	33	A-21"	40.1
DISTRICT 123																
44th Ave.	Vicente	Wawona	9	44.5	44.79	.29	310	.0009	2'-6"x3'-9"	21	46.5	69.4	30	57"	A-51"	62
	Wawona	Sloat	9	44.7	45	.21	250	.0009	2'x3'	11	30.4	46.9	23	48"	A-45"	48
Sloat	44th Ave.	43rd Ave.		45	50.4	5.4	317	.017	2'x3'	48	29.5	46.6	103			
	43rd Ave.	Yorba		50.4	60	9.6	577	.017	"	48	23.1	38.9	124			

OUTFALL NO. 13

DISTRICT NO. 130, 131 & 880

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Lincoln Way	Outfall (13)	La Playa	11	6.5	10.5	4.0	636	.0063	(2(6'x6') + (6'-6"x6'	1300	2247	1730	75	(3) 78"	A-78" Ø	35.0
	La Playa	48th Ave.		10.5	23.5	13	357	.0365	"	3120	2247	1730	180			
Lincoln Way (South Side)	48th Ave.	47th Ave.		23.5	31.5	8	258	.0310	78"	950	1194	934	102			
	47th Ave.	46th Ave.		31.5	41.5	10	310	.032	78"	990	1194	934	103			
	46th Ave.	45th Ave.		41.5	51	9.5	310	.036	"	940	1194	934	101			
Lincoln Way (North Side)	Junction at 48th Ave.	Junction 43rd		23.5	61.5	38	1420	.0268	75"							
District No. 134,135																
Lincoln Way (South Side)	45th Ave.	44th Ave.		51	59	8	310	.0258	(2) 78"	1740	1194	934	186			
	44th Ave.	43rd Ave.		59	67	8	310	.0258	" "	1740	1180	934	186			
	43rd Ave.	42nd		67		9.5	310	.031	78	950	1059	813	117			
	42nd	41st				9.5	310	.031	78	950	1048	813	117			
	41st	40th				9.5	310	.031	78	950	1034	813	117			
	40th	39th			104	9.5	300	.031	78	950	1020	813	117			
Lincoln Way (North Side)	Junction at 43rd	Junction at 39th Ave.		61.5	107	35.5	1390	.0255	66"	550	679	537	104			
Connecting 3'-9" Sewer	Junction with 75" on 43rd Ave.	Junction with 78" at 43rd		61.5	67	5.5	100	.055	45"	280	350	279	100			
Connecting 9' x7'-3" sewer	Junction at 39th Ave.	Junction with basket handle		104	107	3	136	.022	9'x7'-3"	1480	1020	813	180			
Lincoln Way	39th Ave.	38th Ave.		104	113	9	310	.029	78" 7-3"x9'-0"	2300	1597	1290	180			
	38th	37th		113	123	10	"	.032	"	2700	1583	1290	210			
	37th	36th		123	131	8	"	.026	"	2200	1568	1290	170			
	36th	35th		131	140	9	"	.029	78" 66"	2000	1549	1290	155			
	35th	34th		140	148	8	"	.026	"	1850	1530	1290	144			
	34th	33rd		148	154	6	"	.019	"	1320	1510	1290	108			
	33rd	32nd		154	160	6	"	.019	78" 72"	1340	1491	1290	104			
	32nd	31st		160	165	5	"	.016	"	1300	1474	1300	100			
	31st	30th		165	171	6	"	.019	"	1350	1474	1310	103			
	30th	29th		171	177	6	"	.019	"	1350	1185	1070	110			
	29th	28th		177	180	3	310	.0097	"	1200	1171	1065	112			
	28th	27th		180	183	3	"	.0097	"	1200	1158	1070	112			
	27th	26th		183	184	1	"	.0032	"	1100	1144	1070	103			
	26th	25th		184	185	1	"	.0032	"	1100	1132	1070	103			
	25th	24th		185	186	1	"	.0032	"	1100	118	1070	103			
	24th	23rd		186	189	3	"	.0097	"	1200	1103	1070	112			
	23rd	22nd		189	193	4	"	.013	"	1100	1088	1070	103			
	22nd	21st		193	197	4	"	.013	"	1100	1065	1070	103			
	21st	20th		197	200	3	"	.0097	"	1200	1060	10 0	113			
	20th	19th		200	208	8	"	.026	6'-0"x7'-2" 72"	1500	803	810	185			
	19th	18th		208	216	8	"	.026	"	1500	788	800	188			
	18th Ave.	17th Ave.		216	224	8	"	.026	"	1500	784	800	188			
	17th	16th		224	233	9	"	.029	"	1650	774	800	205			
	16th	15th		233	234	1	"	.0032	"	1550	765	800	195			
	15th	14th		234	[illegible]	2	"	.0064	"	800	757	800	100			

PLATE II

OUTFALL NO. 13

DISTRICT NO. 132

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Lincoln Way	48th Ave.	La Playa		10.3	10.5	0.2	460	.00043	3'-6"x5'-3"	34	120	Sanitary flow	100+			
La Playa	Lincoln Way	Irving	9	10.5		0.43	680	.00063	3'6x5'-3"&48"	78	115	105	74	72	A-45"	130.5
	Irving	Judah	9			0.43	680	"	"	78	115	102	76	69	A-42"	119
	Judah	Kirkham	9			0.43	680	"	"	78	108	100	78	69	A-42"	119
	Kirkham	Lawton	9			0.43	680	"	3'x4'-6"&48"	65	105	93	70	69	A-45"	130.5
	Lawton	Moraga	10			0.42	666	"	3'x4'-6	28	92	86	33	66	A-57"	147
	Moraga	Noriega	10			0.36	571	"	"	28	72	73	38	63	A-51"	117
	Noriega	Ortega	9			0.38	601	"	"	28	54	62	52	60	A-48"	118.5
	Ortega	Pacheco	8			0.38	601	"	2'-6"x3'-9"	23	39	52	44	57	A-39"	102
	Pacheco	Quintara	8			0.38	601	"	2'x3'	10	20	30	33	45	A-39"	102
	Quintara	Rivera	8		14.5	0.38	601	"	2'x3'	10	15	27	37	45	A-39"	102
	Note: 48" auxiliary is on Lower Road															
District 136																
Moraga	41st Ave.	40th Ave.		90	102	12	310	.039	4'x6'	470	437	475	99			
40th Ave.	Moraga	Noriega	9	90	101	11	680	.016	"	300	394	460	65	69	A-45"	131
Noriega	40th Ave.	39th Ave.		101	118	17	310	.035	"	460	393	458	100			
	39th Ave.	38th		118	129	11	310	.055	"	540	388	455	118			
38th Ave.	Noreiga	Ortega		118	128	10	310	.032	"	420	274	339	124			
	Ortega	Pacheco	9	128	138	10	680	.0145	3'-6"x5'-3"	200	275	338	59	63	A-45"	131
Pacheco	38th Ave.	37th Ave.		155	138	17	310	.055	"	400	274	339	118			
	37th Ave.	36th Ave.		155	164	9	310	.029	"	410	369	335	120			
	36th Ave.	35th Ave.		164	183	19	310	.061	"	410	365	334	120			
35th Ave.	Pacheco	Quintara	9	164	174	10	680	.015	"	202	348	328	61	63	A-42"	119
Quintara	35th Ave.	34th Ave.	9	174	179	5	310	.016	"	210	246	322	65	60	A-39"	53.8
34th Ave.	Quintara	Rivera	9	179	184	5	680	.0072	"	140	198	271	52	66	A-51"	136
Rivera	34th Ave.	33rd Ave.	10	184	186	2	310	.0066	"	135	197	270	50	66	A-48"	62.2
33rd	Rivera	Santiago	9	186	193	7	680	.010	3'x4'-6"	110	140	200	55	54	A-42"	119
Santiago	33rd Ave.	32nd Ave.	8	193	197	4	310	.013	3'x4'-6"	130	139	200	65	51	A-36"	67.0
	32nd	31st	9	197	200	3	310	.0097	"	110	134	198	55	54	A-42"	54.2
	31st	30th		200	221	21	"	.068	2'-6"x3'-9"	190	129	192	99			
	30th	29th		221	250	29	"	.094	"	220	124	187	118			
	29th	28th	6	250	267	17	"	.055	"	170	118	183	93	39	A-15"	36.9
	28th	27th		267	269	21	"	.0066	"	185	114	180	103			
	27th	26th		269	297	28	"	.09	"	215	109	173	124			
	26th	25th		297	328	31	"	.10	"	230	104	167	138			
	25th	24th		328	357	27	"	.087	"	210	99	161	130			
	24th	23rd	10		359)	2	)	)	"	42	94	157	27	63	A-54"	64.3
	23rd	22nd	10	357	)			.0033	"	42	82	140	30	60	A-51"	63.5
	22nd	21st	9	359	360		"	.0033	"	42	65	115	36	54	A-45"	59.5
	21st	20th	9	360	361	1	"	.0033	"	42	56	104	40	54	A-45"	59.5
	20th	19th		361	369	8	"	.026	2'x3'	64	32	60	107			
	19th	18th		369	387	18	"	.058	"	96	27	50	192			
Noriega	38th Ave.	37th Ave.	7	129	147	18	310	.058	"	96	62	114	84	33	A-18"	39.0
	37th	36th	6	147	165	18	310	.058	"	96	54	102	95			
	36th	35th		165	183	18	310	.058	"	96	47	86	112			
Ortega	38th	37th			169)	41	310)	.066	"	100	38	70	143			
	37th	36th		128	)		310)		"	100	34	63	158			
	36th	35th		169	187	18	310	.058	"	96	33	61	157			
	35th	34th		187	201	14	310	.045	"	85	32	60	142			
Rivera	33rd Ave.	32nd Ave.		186	213	27	310	.087	"	118	48	72	164			
	32nd Ave.	31st Ave.	6	213	221	8	310	.026	"	64	44	67	95			

PLATE 12

OUTFALL NO. 13

DISTRICT NO. 134, 135

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
43rd Ave.	Lincoln	Irving	10	67	70	3	680	.0044	(2) 66"	460	499	430	107			
	Irving	Judah	12	70	73	3	680	.0044	" 56"	460	495	453	101			
	Judah	Kirkham	12	73	75	2	680	.0029	66	230	490	467	49	93"	A-72"	194.6
	Kirkham	Lawton	12	75	78	3	680	.0044	66	230	459	455	50	87'	A-66'	174.6
Lawton	43rd Ave.	42nd Ave.		78	84	6	310	.019	66	480	458	435	103			
	42nd Ave.	41st Ave.		84	99	15	310	.048	4'x6'	520	457	478	108			
41st Ave.	Lawton	Moraga	12	84	90	6	680	.0088	4'x6'	225	438	488	46	78"	A-63"	168.0
30th Ave.	Lincoln	Irving	9	171	179	8	680	.012	3'-6"x3'-3"	185	279	344	52	66'	A-51"	136.0
	Irving	Judah	9	179	203	24	680	.035	3'x4'-6"	210	274	365	57	54'	A-39"	118
	Judah	Kirkham	8	203	230	27	680	.039	3'x4'-6	220	258	343	64	51'	A-36"	117
	Kirkham	Lawton	9	230	235	5	680	.0074	"	95	160	220	43	60"	A-48"	134
Lawton	30th Ave.	29th Ave.	9	235	953	18	310	.058	"	265	142	200	132			
29th Ave.	Lawton	Moraga	9	253	259	6	680	.0088	"	105	136	197	53	57'	A-42'	129
	Moraga	Noriega	8	259	281	22	680	.032	2'-6"x3'-9	120	111	168	71	42'	A-27	126
Noriega	29th Ave.	28th Ave.	7	281	289	8	310	.026	2'x3'	62	53	83	75	33'	A-21'	40
	28th	27th	8	289	295	6	310	.0194	"	55	48	77	71	36'	A-21'	41
	27th	26th	8	295	301	6	310	.0194	"	55	44	71	77	33'	A-21'	41
	26th	25th	8	301	307	6	310	.0194	"	55	39	61	90	33'	A-15'	38.4
	25th	24th	8	307	309	2	310	.0064	"	32	34	57	56	39'	A-27"	57.5
Kirkham	30th Ave.	29th Ave.	8	230	232	2	310	.0064	3'x4'-6"	90	93	140	64	51'	A-36"	67
	29th	28th	8	234	232	2	310	.0064	"	90	88	137	66	51'	A-36"	67
	28th	27th		241	234	7	310	.022	"	165	83	134	123			
	27th	26th	9	240	241	1	310	.0032	"	62	80	132	47	57'	A-45'	69.5
	26th	25th	9	238	240	2	310	.0064	2'x3'	32	57	95	32	45'	A-30"	54
	25th	24th	8	238	246	8	310	.026	"	62	51	92	67	36'	A-24"	54
	24th	23rd	10	246	247	1	310	.0032	"	23	47	88	26	51'	A-45	61
23rd Ave.	Kirkham	Lawton	8	235	230	5	680	.0074	"	35	46	86	40	42'	A-30'	148
26th Ave.	Kirkham	Lawton	8	240	243	3	680	.0044	"	26	22	41	63	30'	A-24"	121
20th Ave.	Lincoln	Irving	9	200	211	11	680	.016	3'-6"x5'-3"	210	252	336	62	60'	A-42"	119
	Irving	Judah	8	211	245	34	680	.050	3'x4'-6"	250	247	342	73	51'	A-30'	138
	Judah	Kirkham	8	245	270	25	680	.037	"	210	222	303	69	51'	A-33	141
	Kirkham	Lawton	6	270	305	35	680	.051	"	250	201	280	87	45'	A-21"	87
	Lawton	Moraga	9	305	312	7	680	.0103	"	110	177	265	41	60'	A-51"	136
	Moraga	Noriega	8	312	332	20	680	.029	"	180	149	232	78	48'	A-27"	126
Noriega	20th Ave.	19th Ave.	8	332	349	17	310	.055	2'-6"x3'-9"	160	125	195	82	39'	A-21"	41
									"	140	90	151	93	39'	A-15"	84.5
19th Ave.	Noriega	Ortega	8	349	379	30	680	.044	2'x3'	86	60	101	85	33	A-18"	87.5
	Ortega	Pacheco	8	379	411	32	680	.047								

OUTFALL NO. 13

DISTRICT NO. 137 & 138

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Lincoln Way	14th Ave.	13th Ave.	10	236	237	1	310	.0032	72" Br.	550	586	665	82	105"	A-54"	64.3
	13th	12th	10	237	238	1	310	.0032	72" "	550	582	660	83	105"	A-54"	64.3
	12th	11th	10	238	239	1	310	.0032	72" Br.	550	577	660	83	105"	A-54"	64.3
	11th	10th	10	239	244	5	310	.016	"	550	568	660	83	78"	A-54"	64.3
	10th	9th	12	244	248	4	310	.013	4'-6"x5'-3"	300	543	590	51	78"	A-66"	80
	9th	8th	9	248	252	6	310	.019	"	370	534	585	63	72"	A-51"	67
	8th	7th	10	252	256	4	310	.013	"	300	526	580	52	78"	A-51"	63.5
7th Avenue	Lincoln	Irving	11	256	273	17	680	.025	3'x4'-6"	190	506	536	35	66"	A-57"	147.0
	Irving	Judah	10	273	303	30	680	.044	"	250	501	536	47	60"	A-48"	136.7
	Judah	Kirkham	10	303	323	20	680	.029	"	300	454	490	61	63"	A-45"	133
	Kirkham	Lawton	10	323	348	25	680	.037	"	230	445	490	47	60"	A-48"	136.7
	Lawton	Moraga	12	348	354	6	680	.0088	3'-6"x5'-3"	170	412	471	36	75"	A-66"	175
	Moraga	Noriega	11	354	359	5	680	.0073	"	155	397	468	33	78"	A-69"	180.5
Laguna Honda	Noriega	Clarendon	10	359	385	26	1550	.0168	"	220	348	444	50	66"	A-51"	139.5
14th Ave.	Lincoln Way	Irving		234.1	236.4	2.3	680	.0034	60"&3'-6"x 5'-3"	258	182	246	105			
Irving	14th Ave.	12th Ave.		236.4	238.4	2	620	.0032	54"	115	101	113	102			
12th Ave.	Irving	Judah		238.4	268.4	30	680	.044	39	175	71	107	164			
14th Ave.	Irving	M.H.		236.4	240.4	4	267	.015	3'-6"x5'-3"	200	81	133	150			
	M.H.	Judah		240.4	246.4	6	353	.017	3'x4'-6"	145	81	133	110			
Judah	14th Ave.	Funston		246.4	258.4	12	310	.039	2'-6"x3'-9"	132	62	94	140			
	Funston	12th		258.4	268.4	10	310	.032	"	120	57	84	143			
12th Ave.	Judah	Kirkham	8	268.4	295.4	27	620	.043	"	140	128	191	73	39"	A-27"	114.6
Kirkham	12th Ave.	11th Ave.		295.4	305.4	10	310	.032	"	120	79	120	100			
	11th Ave.	10th Ave.		305.4	319.4	14	310	.045	2'x3'	78	44	68	115			
10th Ave.	Kirkham	Lawton		319.4	369.4	50	635	.079	"	102	34	62	167			
10th Ave.	Lincoln	Irving	9	244.4	251.4	7	680	.0103	2'-6"x3'-9" Br.	70	68	93	75	42"	R	118.8
	Irving	Judah		251.4	273.4	22	680	.032	"	120	64	90	134			
Judah	10th Ave.	9th Ave.	8	273.4	278.4	5	310	.016	2'x3' Br.	47	58	84	56	36"	R	67.0
	9th Ave.	8th Ave.		278.4	288.4	10	310	.032	"	66	21	31	213			
8th Ave.	Judah	Kirkham		288.4	319.4	31	680	.045	"	80	17	24	330			
Kirkham	8th Ave.	7th Ave.		319.4	323.4	4	310	.013	"	42	12	20	210			
<u>District 139</u>																
Laguna Honda	Clarendon	400' N. Magellan	10	385	396	8	700	.0114	2'x3'	42	137	187	21	51"	A-48"	141
	400' N. of Magellan	Magellan	8	396	429	33	400	.082	"	112	131	180	44	36"	A-27"	74.2
	Magellan	Dewey	8	429	482	51	770	.066	"	102	94	138	54	36"	A-21"	102
	Dewey	Merced	8	482	485	3	280	.0108	"	41	81	123	33	45"	A-39"	47.6
	Merced	Vasquez	8	485	493	8	300	.0267	"	64	74	113	55	39"	A-27"	55.6
Clarendon	Laguna Honda	800' E		385	400	15	800	.0187	57"	318	210.8	274	116			
	800' E	Olympia	8	400	451	51	550	.093	36"	210	169	238	88	39"	A-18"	70.6
Olympia	Clarendon	160' E		451	470	19	160	.119	36"	235	89.6	127	185			
	160' E	Dellbrook		470	488	18	525	.0342	36"	126	89.6	127	100			

OUTFALL NO. 14

DISTRICT NO. 140, 142 & 144

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Fulton	48th Av.	La Playa		28	19	9	310	.029	2'-0"x3'-0"	63	46	40.5	156			
	La Playa	Grt. Highway		19	25	6	"	.019	"	52	42	40	130			
DISTRICT NO. 142																
Fulton	48th Av.	47th Av.	10	28	31	3	310	.0097	4'x6'	238	388	482	49	72"	A-60"	71.0
	47th	46th		31	43	12	"	.039	"	465	377	472	99	57		
	46th Av.	45th		43	55	12	310	.039	"	465	298	382	122			
	45th	44th	10	55	57	2	"	.0064	"	190	240	382	50	66	A-57"	68.5
	44th	43rd	10	57	59	2	"	.0064	"	190	294	382	50	75	A-57"	68.5
	43rd Av.	42nd		59	75	16	310	.052	3'-6"x5'-3"	380	249	326	117			
	42nd	41st		75	91	16	"	.052	"	380	244	324	125			
	41st	40th	9	91	95	4	"	.013	"	190	227	305	62	60	A-42"	54.2
	40th Av.	39th Av.	8	95	99	4	310	.013	"	190	156	213	89	54	A-24"	56.1
	39th	38th	8	99	103	4	"	.013	"	190	152	210	90	54	A-24"	56.1
	38th	37th	8	103	107	4	"	.013	"	190	147	208	91	54	A-24"	56.1
	37th	36th	8	107	111	4	"	.013	3'x4'-6"	125	122	176	71	54	A-33"	64.0
	36th	35th	9	111.5	113	1.5	"	.0048	"	76	104	154	49	51	A-45"	59.5
	35th	34th	8	113	116	3	"	.0097	2'-6"x3'-9"	66	84	128	51	51	A-36"	67.2
	34th	33rd	8	116	119	3	"	.0097	"	66	65	101	65	42	A-30"	60.1
	33rd	32nd	8	119	123	4	"	.013	2'-0"x3'-0"	42	48	77	55	42	A-30"	60.1
	32nd	31st	7	123	127	4	"	.013	"	42	31	52	81	33	A-18"	39.1
	31st	30th		127	131	4	"	.013	"	42	22	38	110			
46th Ave.	Fulton	Cabrillo	9	43	47	4	680	.0059	2'-6"x3'-9"	52	96	138	38	54	A-45"	130.5
43rd Av.	Fulton	Cabrillo	8	39.75	65	5.25	680	.0077	2'-0"x3'-0"	32	46	49	65	36	A-24"	123.0
40th Av.	Fulton	Cabrillo	7	95.5	119	23.5	680	.035	"	70	70	84	84	33	A-18"	85.6
Cabrillo	40th Av.	39th Av.	8	119	121	2	310	.0064	"	29	56	69	42	39	A-33"	64.0
39th Av.	Cabrillo	Balboa		121	168	47	680	.069	"	98	32	41	240			
DISTRICT 144																
48th Ave.	Lincoln	Irving	8	14	15.3	1.3	680		102"	480	456	496	97	102		
	Irving	Judah	8	15.3	16.6	1.3	680	.0019	"	480	433	496	97	102		
	Judah	Kirkham	8	16.6	18	1.3	680		"	480	425	496	97	102		
Kirkham	48th Av.	47th Av.		18	23	5	310	.016	96"	1200	425	496	240			
47th Ave.	Kirkham	Lawton	11	23	24	1	680	.0014	"	350	442	473	74	108	A-66"	172.0
	Lawton	Moraga	11	24	25	1	680	.0014	"	350	429	473	74	108	A-66"	172.0
	Moraga	Noriega	11	25	26	1	680	.0014	"	350	400	466	75	108	A-66"	172.0
Noriega	47th Av.	46th		26	27	1	310	.0032	"	520	400	466	112			
46th Ave.	Noreiga	Ortega	13	27	27.43	0.43	680	.00063	"	240	304	442	54	123	A-93"	257.0
	Ortega	Pacheco	13	27.43	27.86	0.43	680	.00063	"	240	262	414	58	120	A-87"	246.0
	Pacheco	Quintara	12	27.86	28.3	0.43	680	.00063	"	240	221	381	63	117	A-78"	215.5
	Quintara	Rivera	12	28.3	28.73	0.43	680	"	90"	210	162	321	65	108	A-72"	193.6
	Rivera	Santiago	10	28.73	29.2	0.43	680	"	"	210	100	251	84	99	A-51"	139.0
	Santiago	Taraval	10	29.2	29.6	0.43	680	"	84"	170	61	202	85	96	A-45"	133.0
	Taraval	Ulloa		29.6	30	0.43	680	"	"	170	12	121	140			
Ulloa	46th Ave.	45th Ave.		30	35	5	310	.016	78"	580	12	121	480			
45th Ave.	Ulloa	Vicente		35	37	2	680	.0029	" "	290	11	100	290			
Pacheco	46th	45th	8	25	27.5	2.5	310	.0081	2'-0"x3'-0"	37	74	64	58	39	A-27"	57.5
Quintara	46th Ave.	45th Ave.	8	25	31.5	6.5	310	.021	"	58	85	145	40	42	A-36"	67.1
	45th	44th	8	31.5	39	7.5	310	.024	"	62	80	139	45	42	A-33"	64.0
	44th	43rd	7	39	66	27	310	.087	"	118	73	128	92	30	A-12"	33.4
	43rd	42nd	8	66	73.5	7.5	310	.024	"	62	72	127	49	39	A-30"	60.1
	42nd	41st	7	73.5	87.5	14	310	.045	"	84	67	121	55	36	A-24"	55.0
	41st	40th	7	87.5	89	1.5	310	.043	"	82	60	110	55	36	A-21"	40.3

OUTFALL NO. 14

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
48th Ave.	Lincoln	Irving	8	14	15.3	1.3	680		8'-6"Ø	480	456	496	97	102"		
	Irving	Judah	8	15.3	16.6	1.3	680	.0019	"	480	433	496	97	102"		
	Judah	Kirkham	8	16.6	18	1.3	680		"	480	425	496	97	102"		
Kirkham	48th Ave.	47th Ave.		18	23	5	310	.016	8'-0"Ø	1200	425	496	240			
47th Ave.	Kirkham	Lawton	11	23	24	1	680	.0014	8'-0"Ø	350	442	473	74	108"Ø	A-66"Ø	172.0
	Lawton	Moraga	11	24	25	1	680	.0014	"	350	429	473	74	108"Ø	A-66"Ø	172.0
	Moraga	Noriega	11	25	25	1	680	.0014	"	350	400	466	75	108"Ø	A-66"Ø	172.0
Noriega	47th Ave.	46th Ave.		26	27	1	310	.0032	8'-0"Ø	520	400	466	112			
46th Ave.	Noriega	Ortega	13	27	27.43	0.43	680	.00063	8'-0"Ø	240	304	442	54	123"Ø	A-93"Ø	257.0
	Ortega	Pacheco	13	27.43	27.86	0.43	680	"	8'-0"Ø	240	262	414	58	120"Ø	A-87"Ø	246.0
	Pacheco	Quintara	12	27.86	28.3	0.43	680	"	8'-0"Ø	240	221	381	63	117"Ø	A-78"Ø	215.5
	Quintara	Rivera	12	28.3	28.73	0.43	680	.00063	7'-6"Ø	210	162	321	65	108"Ø	A-72"Ø	193.6
	Rivera	Santiago	10	28.73	29.2	0.43	680	"	"	210	100	251	84	99"	A-51"Ø	139.0
	Santiago	Taraval	10	29.2	29.6	0.43	680	"	7'-0"Ø	170	61	202	85	96"Ø	A-45"Ø	133.0
	Taraval	Ulloa		29.6	30	0.43	680	"	"	170	12	121	140			
Ulloa	46th Ave.	45th Ave.		30	35	5	310	.016	6'-6"Ø	580	12	121	480			
45th Ave.	Ulloa	Vicente		35	37	2	680	.0029	6'-6"Ø	290	11	100	290			
Pacheco	46th Ave.	45th Ave.	8	25	27.5	2.5	310	.0081	2'-0"x3'-0"	37	74	64	58	39"Ø	A-27"Ø	57.5
Quintara	46th Ave.	45th Ave.	8	25	31.5	6.5	310	.021	2'-0"x3'-0"	58	85	145	40	42"Ø	A-36"Ø	67.1
	45th	44th	8	31.5	39	7.5	310	.024	"	62	80	139	45	42"Ø	A-33"Ø	64.0
	44th	43rd	7	39	66	27	310	.087	"	118	73	128	92	30"Ø	A-12"Ø	33.4
	43rd	42nd	8	66	73.5	7.5	310	.024	"	62	72	127	49	39"Ø	A-30"Ø	60.1
	42nd	41st	7	73.5	87.5	14	310	.045	"	84	67	121	55	36"Ø	A-24"Ø	55.0
	41st	40th	7	87.5	89	1.5	310	.043	"	82	60	110	55	36"Ø	A-21"Ø	40.3
Outfall District																
48th Ave.	Outfall	Cabrillo		-2.86	23.85	26.71	4400	.0061	9'x11'	1580	482	594	266			
	Cabrillo	Fulton		23.85	28	4.15	680	.0061	9'x11'	1580	"	"	266			

OUTFALL NO. 16

DISTRICT NO.161

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
	Outfall (16)	Grade break		- 3.5*	50	53.5	80	.66	72"	1500	472	552	300			
Easement	Grade break	Sea Cliff	8	50	52.25	2.25	150	.015	"	520	472	552	94	75"	A-27	28.37
	Sea Cliff	27 +00	6	52.25	55.60	3.40	230	.015	"	520	444	527	99	75"	A-15'	11.88
	24 + 00	El Camino		55.60	78.20	12.6	840	.015	"	520	421	510	102			
	El Camino	West Clay		78.20	82.25	4.05	270	.015	"	520	409	498	104			
24th Ave.	West Clay	Lake		100.5	124	23.5	470	.05	"	980	463	495	200			
	Lake	California	8	124	125	1	680	.0015	3'-10"x5'-9"	70	88	118	55	63"	A-45"	127.91
California	24th	25th	8	125	126	1	310	.0032	3'x4'-6"	62	87	119	52	54"	A-42'	54.60
	25th	26th		126	130	4	"	.013	"	150	81	114	130			
	26th	27th		130	138	8	"	.026	2'-6"x3'-9"	110	75	106	104			
	27th	28th	8	138	140	2	"	.0064	"	54	70	101	54	48"	A-36"	55.83
	28th	29th		140	151	11	"	.035	"	127	64	95.5	133			
	29th	30th		151	164	13	"	042	"	140	63	95	158			
	30th	31st		164	177	13	"	.042	"	140	60	93	150			
31st Ave.	California	Clement	6	177	180	3	680	.0044	2'-6"x3'-9"	44	51	77	57	45"	A-24"	47.33
Clement	31st Ave.	32nd Av.		180	187	7	310	.022	2'-6"x3'-9"	105	46	72	146			
Lake	24th Ave.	23rd Ave.		124	116	8	310	.026	72'	700	321	434	140			
23rd Ave.	Lake	California	10	116	118	2	680	.0029	4'x6'+2'-4" x3'-6"	130	241	291	45	78"	A-60"	148.78
	California	Clement	8	118	122	4	"	.0059	4'x6'+2'-4" +3'-6"	226	235	286	79	69'	A-39'	109.67
	Clement	Geary		122	131	9	"	.013	3'-6"x5'-3"	254	179	230	110			
	Geary	Anza	8	131	134	3	"	0044	3'x4'-6"	74	92	125	59	54"	A-39"	109.66
	Anza	Balboa	8	134	137	3	"	.0044	"	74	81	120	62	54"	A-36"	157.95
	Balboa	Cabrillo		137	140	3	"	.0044	"	74	74	120	62	54"	A-36"	157.95
Cabrillo	23rd Av.	24th Av.	8	140	141.5	1.5	310	.0048	3'x4'-6"	78	41	82	95	45"	A-21"	40.96
	24th	25th		141.5	143	1.5	"	.0048	"	78	32	66	118			
	25th	26th		143	150	7	"	.0225	"	175	22	48	750			
26th Avenue	Cabrillo	Fulton		150	160	10	680	.015	3'x4'-6"	130	20	35	370			
22nd Avenue	Lake	California		113	120	7	680	.01	54"	200	90	130	154			
	California	Clement		120	125	5	680	.0073	54"	170	87	120	142			
	Clement	Geary		125	129	4	680	.0059	54"	160	84	117	137			
Geary	22nd Ave.	21st Av.	9	129	130	1	310	.0032	33"	30	33	57	52.5	42"	A-30".	60.70
	21st Ave.	20th Av.	8	130	134	4	"	.013	33"	60	21	36	166			
Lake St.	22nd Ave.	21st Av.	8	113	114	1	310	.0032	66"	190	185	205	93	69"	A-27"	57.7
	21st	20th	8	114	115	1	"	.0032	66"	190	179	204	93	69"	A-27"	57.7
	20th	19th		115	117	2	"	.0064	66"	270	173	202	134			
	19th	18th	8	117	118	1	"	.0032	66"	190	168	200	95	69"	A-24"	56.3
	18th	17th		118	120	2	"	.0064	60"	220	145	176	125			
Geary	22nd Av.	23rd		129	131	21	310	.0064	36"	54	34	50	108			
Geary	23rd	24th	7	131	141	10	310	.032	2'-6"x3'-9"	120	64	118	102			
	24th	25th	6	141	145	4	"	.013	2'x3'	42	35	66	64	36"ø	A-24"	21.63
	25th	26th	6	145	152	7	"	.025	"	58	32	61	95	30"ø	A-12"	12.57
	26th	27th		152	157	5	"	.016	"	46	27	53	87	33"ø	A-15"	15.98
24th Ave	Anza	Geary	8	141	143	2	680	.0029	2'x3'	20	24	46	43	39"ø	A-33"	115.92

OUTFALL NO. 18

DISTRICT NO. OUTFALL DISTRICT

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
7'ø Line	Outfall (Station 4+ 36.76)	Junction with 5' sewer from 22nd Av. (Sta.0+27.35)	10	9	22	13	411	.031	84"	1,250	1,085	1,385	75	87"	A-39"	115.0
22nd AVENUE BRANCH																
	Junction with 7'ø sewer leading to outfall	Junction with 3'ø sewer leading to Ju		22	42	20	1015.1	.02	60	380	185	205	186			
3'ø sewer leading to 22nd Ave.	Junction with 5'ø sewer	22nd Ave.		42	86	44	130	.34	36	400	185	205	196			
22nd Ave.	Junction with 3'-øsewer	Lake		86	104.5	18.5	407	.045	54	440	185	205	215			
17th AVENUE BRANCH																
(7'ø sewer)	Junction Structure on outfall (Sta. 28+64	Grade break (St. 27+00)		22	38	16	164	.098	84	1,800	900	1,180	152			
	Grade break (St. 27+00)	Junction with 6'-6"ø sewer (Sta.23+00)		38	54	16	400	.04	84	1,250	900	1,180	106			
6'-6" ø sewer	Junction (Sta. 23+00)	Grade break (Sta. 4+05)	12	54	77	23	1895	.012	78	500	900	1,180	42	102	A-69"	431.0
	Grade break (Sta. 4+05)	17th Ave. (3+11)		77	118	41	94	.43	78	1,700	900	1,180	144			
6'-6" øsewer (17th Ave.)	Grade break (Sta. 3+11)	Grade break (Sta. 0+64)	8	113	118	5	247	.02	78	780	838	815	96	81		
	Grade break (Sta. 0+64)	Lake St.	12	118	121	3	64	.0047	78	380	838	815	46	108	A-84"	21.5

PLATE 18

OUTFALL NO. 18

DISTRICT NO. 181 - 182

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
17th St.	Lake	California	9	120	122	2	680	.003	54"	110	138	176	62	66"	A-45"	131.17
	California	Clement		122		15.5	680	.011	"	210	133	179	118			
	Clement	Geary			137.5		680	.011	"	210	128	181	116			
Geary	17th Ave.	16th Av.	8	137.5	145	7.5	310	.024	2'-3"	50	45	71	70	33"	A-21"	18.04
	16th	15th	6	145	155	10	310	.032	2'-0"	40	31	50	80	27"	A-15"	15.38
Lake	17th Ave.	16th Ave.	10	120	123	3	310	.0097	84	650	838	822	79	93"	A-48"	61.11
	16th	15th	12	123	125	2	310	.0065	"	520	827	815	64	99"	A-69"	80.88
	15th	14th	12	125	128	3	310	.0097	"	650	815	815	80	93"	A-57"	67.34
14th Ave.	Lake	California	9	128	133	5	680	.0074	4'x 6'Br.	210	291	294	72	66"	A-42	136.46
	California	Clement		133	148	15	680	.022	"	360	304	297	122			
	Clement	Geary	8	148	159	11	680	.016	"	300	330	317	95	45"	A-21"	90.09
Geary	14th Ave.	Funston	12	159	162	4	310	.0064	"	190	110	120	158			
	Funston	12th Ave.	12	162	163		310	.0064	"							
	12th	11th	12	163	164	1	310	.0032	3'-11"x5'-10"	130	105	118	110			
	11th	10th	12	164	164.5	0.5	310	.0016	3'-10x5'-9"	84	101	118	71	63"	R	74.10
	10th	9th	12	164.5	165	0.5	310	.0016	"	84	97	117	83	63"	R	74.10
	9th	8th	12	165	166	1	310	.0032	3'-9"x5'-7" Br.	110	102	116	88	54"	R	63.27
	8th	7th	12	166			310	.0024	3'-8"x5'-3" Br.	94	94	119	79	60"	R	69.34
	7th	6th	10			3	"	.0024	3'-3"x4'-11" Br.	62	85	110	56	57"	R	67.35
	6th	5th	10				"	.0024	3'x4'-5"	54	31	63	86	48"	R	61.19
	5th	4th	10		169		"	.0024	28"	16	22	46	35	42"	R	56.34
	4th	3rd		169	176	7	310	.025	27"	50	14	28	180			
	3rd	2nd		176	186	10	310	.032	27"	56	5.5	11	510			
Funston	Geary	Anza	6	162	170	8	680	.012	2'x3'	44	48	51	86	30"	A-15"	31.36
	Anza	Balboa		170	207	37	680	.054	2'x3'	92	45	50	184			
	Balboa	Cabrillo	6	207	214	7	680	.010	2'x3'	40	36	42	98	30"	A-12"	27.56
Cabrillo	Funston	12th	8	214	215	1	310	.0032	2'x3'	23	27	33	70	36"	A-24	21.66
Geary	14th	Funston		159	162	3	310	.0097	72"	430	181	188	230			
	Funston	12th		162	163	1	"	.0032	66"	200	125	137	146			
	12th	11th		163	164	1	"	.0032	60"	150	107	117	128			
	11th	10th	8	164	164.5	0.5	"	.0016	60"	108	102	116	93	63"	A-24"	44.72
	10th	9th	8	164.5	165	0.5	"	.0016	60"	108	97	114	95	63"	A-24"	44.72
	9th	8th		165	166	1	"	.0032	54"	113	77	92	122			
Eight	Geary	Anza		166	176	10	680	.0147	2'-6"x3'-9"	82	63	79	104			
Anza	8th Ave.	7th Ave.	8	176		7	310	.0056	2'-6"x3'-9"	50	49	63	80	39"	A-24"	21.66
	7th	6th					310	.0056	"	50	34	46	108			
	6th	5th					310	.0056	"	50	21	30	166			
	5th	4th			183		310	.0056	"	50	21	30	166			
Geary	17th Ave.	18th Ave.	10	137.5	138	0.5	310	.0016	42"	40	45	78	51	54"	A-42"	57.70
	18th Ave.	19th Ave.	9	138	139	1	310	.0032	33"	30	21	38	79	39"	A-24"	57.07

OUTFALL NO. 18

DISTRICT NO. 183

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Lake	14th	Funston		128	136.5	8.5	310	.027	72"	700	504	564	124			
	Funston	12th Av.	8	136.5	141	4.5	"	.014	72"	520	498	560	92	78"	A-24"	56.1
	12th	11th	10	141	145	3	"	.0097	72"	440	496	568	78	81"	A-48"	59.98
	11th	10th	8	145	150	5	"	.015	72"	550	492	570	96	75"	A-21"	41.07
	10th	9th		150	160	10	"	.032	72"	600	465	548	110			
	9th	8th		160	163	3	"	.0097	90"	780	464	550	142			
8th Ave.	Lake	California	12	163	164.3	1.3	680	.00191	90"	340	380	505	67	105"	A-66"	175
California	8th Ave.	Junction 7th-8th	13	164.3	164.6	0.3	180	.00017	90"	105	356	450	23	(2) 120"	A-(3)93"	213
	Junction 7th & 8th	5th		164.6	166	1.4	750	.0019	90"	340	332	432	79	99"	A-57"	166
Cornwall	5th	4th		166	170	4	1220	.013	72"	500	305	424	118			
	4th	3rd		170	174	4			72"							
	3rd	2nd		174	180	6			72"							
	2nd	Arguello		180	182	2			72"							
Arguello	Cornwall	Euclid		182	185	3	450	.0067	72"	360	245	347	104			
Euclid	Arguello	Palm		185	186.5	1.5	340	.004	60"+2'x3'	206	78	116	178			
	Palm	Jordan		186.5	189	2.5	320	.0078	57+2'x3'	188	72	110	172			
	Jordan	Commonwealth		189	203	14	320	.044	36+18"	162	65	105	154			
	Commonwealth	Parker		203	217	14	270	.052	36+15"	185	59	97	190			
Parker	Euclid	California		217	225	8	820	.0098	39"	84	45	79	106			
California	Parker	Spruce	8	225	238	3	390	.0077	33"	48	42	75	64	42"	A-24"	57.51
10th	Lake	California		150	153	3	680	.0044	2'-6"x3'-9"	48	11	22	218			
California	10th Av.	9th Av.		153	161	8	310	.026	2'-6"x3'-9"	120	7	12.5	950			
	9th	8th		161	162	1	310	.0032	"	130	6	10	1300			
California	8th Av. (From mid-blk	7th Av.	9	161	162	1	155	.0064	2'-6"x3'-9"	58	125	172	34	54"	A-48"	61
	7th junct'n)	6th	9	162	164	2	310	.0064	"	58	111	154	38	51"	A-45"	60
	6th	Junction	9	164	166	2	310	.0064	"	58	105	148	39	51"	A-45"	60
Arguello	Euclid	Geary		195	195	10	900	.011	63"	315	171	223	140			
	Geary	Anza	8	195	198	3	694	.0043	48"	97	83	135	72	54"	A-36"	126.99
	Anza	Edward		198	202.5	4.5	493	.0091	42"	98	56	96	102			
	Edward	Turk	7	202.5	205	2.5	286	.0087	39"	78	51	90	87	42"	A-21"	38.31
	Turk	Golden Gate		205	210	5	362	.0134	33"	60	31	58	104			
	Golden Gate	McAllister		210	218	8	335	.024	27"	48	20	35	137			
Geary	Arguello	Palm	12	195	201	6	930	.0011	48" + 26"	60	88	168	35	78"	A-66"	
	Palm	Jordan	12	201	203	2			" "	60	86	168	35	78"	A-66"	239.46
	Jordan	Commonwealth	12	203	205	2			" "	60	84	167	36	78"	A-66"	
	Commonwealth	Parker	8	205	208	3	400	.0075	" "	153	83.5	166	92	54"	A-21"	53.04
	Parker	Spruce		208	212	4	320	.0125	45"	150	69	141	106			
	Spruce	Cook	8	212	216	4	320	.0125	39"	94	61	124	76	42"	A-27"	57.72
	Cook	Blake		216	225	9	320	.028	36"	100	49	100	100			
	Blake	Collins		225	240	15	320	.047	27"	68	29	59	116			
Lake	8th Av.	7th Av.	8	163	165	2	310	.0065	2'-6"x3'-9"	58	55	76	76	42"	A-24"	56.29
	7th	6th		165	173	8	310	.026	"	120	51	82	146			

OUTFALL NO. 20

DISTRICT NO. Outfall district

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
108" Gravity outfall	outlet (station 2 + 90)	Flotation Plant (station 0+00)		- 4.08	-1.83	2.25	290	*.0078	108"	1100	186	212	520			
108" Bypass	Station 0+00	Weir (junction with 96" ø from Baker)		-1.83	-0.6	1.23	158	*.0078	108"	1100	186	212	520			
96" Influent sewer	connection with 108" bypass	Transition structure (at Baker)		-0.6	0	.6	309	*.00195	96"	400	186	212	190			
Baker	Transition Structure	60" sewer at Marina		0	.223	.223	60	.0037	6'x5'-6"	240	186	212	114			
	Marina	Jefferson	9	.223	1.49	1.27	344	.0037	60"	160	172	205	78	66"	A-39"	101
	Jefferson	Beach	9	1.49	2.76	1.27	344	.0037	60"	160	167	205	78	66"	A-39"	59.8
	Beach	North Point	9	2.76	4.03	1.27	344	.0037	60"	160	162	205	78	66"	A-39"	59.8
	North Point	Bay	8	4.03	5.30	1.27	344	.0037	60	160	153	200	80	66"	A-36"	74.5
	Bay	Francisco	8	5.30	6.50	1.20	309	.0037	60"	160	147	192	83	66"	A-33"	71.5
District #200																
Baker	Francisco	Chestnut		6.50	18.75	12.25	378	.0325	2'-6"x3'-9"	122	97	128	95	36"		
	Chestnut	Lombard		18.75	30	11.25	344	.0325	2'-6"x3'-9"	122	91	123	100			
	Lombard	Greenwich	8	30	45	15	344	.0435	2'x3'	78	86	118	66	33"	A-24"	62.2
	Greenwich	Filbert	7	45	60	15	344	.0435	2'x3'	78	80	110	71	33"	A-21"	44.6
	Filbert	Union		60	88	28	259	.108	2'x3'	122	72	101	120			
Union	Baker	Lyon	7	88	120	30	480	.0625	24"	56	56	89	63	30"	A-21"	62.3
Presidio Reservation																
1st Reach	Lyon	Begin 4'x5'-6" sewer		120	122.0	2.0	97	.0206	2'-6"x3'-9"	104	55	89	117			
2nd Reach	4'x5'6" sewer	End 4'x5'-6"sewer	7	122.0	148.60	26.6	1320	.0281	4'x5'-6"	320	55	89	360			
3rd Reach	End 4'x5'-6"sewer	Locust	7	148.6	166	17.4	1040	.0167	2'-6"x3'-9"	93	55	89	105			

OUTFALL NO. 21

DISTRICT NO. 210

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Outfall Sewer	Outfall	N. End Weir	11	*-1.60	-1.47	.13	65	.0020	84"	290	442	514	56	105"	A-57"	25.1
	N. End Weir	S. End Weir		*-1.47	-1.26	.21	100	.0020	Weir Str.							
Pierce	S. End Weir	Marina	11	*-1.26	- .80	.46	214	.0020	96"	420	442	514	82	105"	A-57"	82.4
	Marina	Prado		*- .80	.56	1.36	455	.0030	90"	430	347	418	103			
	Prado	Beach		* .56	2.08	1.52	333	.0030	90"	430	340	417	103			
	Beach	Capra		* 2.08	4.32	2.24	455	.005	84"	460	296	376	125			
	Capra	Francisco	9	* .32	5.1	0.83	166	.005	72"	320	285	374	86	78"	A-39"	48.6
Marina	Pierce	Casa Way	7	*- .80	-.65	.15	250	.006	2'-6"x3'-9"	52	53	65	80	51"	A-21"	58.7
	Casa Way	Fillmore	7	* - .65	-.28	.37	620	.006	"	52	41	57	91	48"	A-15"	140.5
Fillmore	Marina	Jefferson	8	*- .28	0.79	1.02	373	.0027	2'x3'	18	27	40	45	39"	A-33"	103.
	Jefferson	Beach	8	* 0.79	1.69	.90	344	.0026	"	18	23	36	50	36"	A-30"	90.
Beach	Fillmore	Webster	8	* 1.69	2.44	.75	481	.0015	2'x3'	14	17	28	50	33"	A-30"	125.5
Marina	Pierce	Scott	8	*-0.80	-0.53	0.27	481	.00056	2'-6"x3'-9"	15	17.4	25.6	58	42"	A-33'	133.0
	Scott	Divisadero	8	*-0.53	-0.23	0.30	540	.00056	2'x3'	8.5	9.1	16.1	53	36"	A-30"	141.0
	Divisadero	Broderick		*-0.23	0	0.23	415	.00056	2'x3'	8.5	2.6	5.7	150			
District No.211																
Pierce	Francisco	Chestnut		5.1	17	11.9	344	.035	3'x5' Br.	200	303	176	114			
	Chestnut	Lombard	9	17	30	13	344	.038	2'x3'	72	49	86.5	84	42"	R	60.2
Francisco	Pierce	Scott	10	5.1	6	1.1	480	.0021	3'x4'x6"	50	65	113.5	44	60"	A-48"	96.5
Scott	Francisco	Chestnut	8	6	10	4	344	.012	2'-6"x3'-9"	74	55	93	80	39"	A-24"	62.2
	Chestnut	Lombard	6	10	18	8	344	.023	2'-6"x3'-9"	102	48	105	97	36"		
Chestnut	Pierce	Steiner		9	17	8	480	.016	3'x5' cone	160	63	105	152			
Steiner	Chestnut	Lombard	8	17	24	7	344	.020	2'-0"x3'-0"	52	60	103	50	36"	A-30"	66.7
	Lombard	Greenwich	9	24	27	3	344	.0087	"	33	57	101	33	45"	A-39"	59.8
	Greenwich	Filbert	8	27	34	7	344	.020	"	52	52	94	55	36"	A-27"	63.8
Francisco	Pierce	Fillmore	10	10	18	8	960	.009	3'-6"x5'-3"	120	121	226	53	60"	A-45"	188.0
Fillmore	Francisco	Chestnut	10	18	21.5	2.5	344	.0073	3'x5' Br.	110	118	183	59	57"	A-39"	61.0
	Chestnut	Lombard	10	21.5	24.5	3	344	.0087	"	120	99	160	75	51"	A-39"	61.0
Lombard	Fillmore	Webster		24.5	30.5	6	480	.012	3'x5' Br.	140	81	121	116			
	Webster	Buchanan	11	30.5	33	3	480	.0032	"	70	71	123	57	57"	R	103.5
	Buchanan	Laguna		33	33.5	3	480	.0031	"	70	38	64	110			
Laguna	Lombard	Greenwich		33.5	37.5	3	344	.0087	3'x5' Br.	120	33.5	63.5	190			
	Greenwich	Filbert		36.5	44.5	8	344	.023	"	190	30	58	327			
	Filbert	Union		44.5	70.5	26	344	.076	"	360	27	50	720			
	Union	Green		70.5	96.5	26	344	.076	"	360	23	46	780			

PLATE 22

OUTFALL NO. 22

DISTRICT NO. 220

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Outfall Laguna	Outfall	Beach		1.8	12	10.2	309	.033	72"	765	357	512	150			
	Beach	North Point		12	17	5	344	.0146	"	530	356	512	103			
	North Point	Bay		17	27	10	318	.0315	"	760	355	512	148			
District No.220																
Laguna	Bay	Francisco		27	29	2	344	.0058	72"	340	149	218	156			
	Francisco	Chestnut		29	31	2	344	.0058	"	340	138	208	163			
	Chestnut	Lombard		31	33	2	472	.00425	66"	230	127	200	115			
Lombard	Laguna	Octavia		33	36	3	474	.0063	60"	210	134	200	105			
	Octavia	Gough		36	43	7	488	.0144	3'x5' Br.	155	97	152	102			
	Gough	Franklin		43	60	17	481	.0354	"	240	92	150	160			
Bay	Laguna	Octavia		27	45	18	481	.0374	54"	380	206	294	130			
	Octavia	Gough		45	53	8	481	.0166	60"	350	203	294	120			
	Gough	Franklin		53	56.9	3.9	481	.008	"	290	190	286	101			
Franklin	Bay	Francisco		56.9	59.1	2.2	344	.0064	72"	350	190	286	122			
	Francisco	Chestnut		59.1	61.	2.1	344	.0062	"	340	179	260	130			
	Chestnut	Lombard		61	65.6	5.5	344	.016	"	550	147	215	255			
	Lombard	Greenwich		65.6	69.8	4.2	344	.0122	"	382	239	365	104			
	Greenwich	Filbert		69.8	73.8	4	344	.0116	66"	375	230	356	106			
	Filbert	Union		73.8	78	4.2	344	.0122	"	380	213	336	113			
	Union	Green	9	78	90	12	344	.035	3'x5'	230	193	307	75	51"	R	68.8
	Green	Vallejo		90	114	24	355	.0675	"	320	170	273	118			
Vallejo	Franklin	Gough		114	122	8	481	.0166	3'x5'	150	14	23	650			
	Gough	Octavia		122	130	8	481	.0166	"	150	13	21	715			
	Franklin	Van Ness	9	114	125	11	481	.023	3'x5' Br.	185	109	200	93	48"	R	94.7
	Van Ness	Polk		125	136	11	481	.023	3'x5' Br.	185	89	168	110			
Polk	Vallejo	Broadway	10	136	140	4	351	.0114	3'x5' Br.	135	88	188	72	54"	R	72.8
	Broadway	Pacific		140	160	20	341	.059	"	300	52	102	295			
	Pacific	Jackson		160	177	17	324	.0525	"	280	37	73	383			
	Jackson	Washington		177	180	3	324	.0093	"	120	20	42	285			
Octavia	Lombard	Greenwich		36	42	6	344	.0174	48"	180	37	52	345			
Greenwich	Octavia	Gough		42	46	4	481	.0083	2'-6"x3'-9"	62	30	42	148			
Gough	Greenwich	Filbert	6	46	48	2	344	.0058	2'x3'	28	24	32	87	30"	A-15"	41.0
Pacific	Polk	Van Ness		160	166	6	481	.0125	3'x5' Br.	140	33	56	250			
	Van Ness	Franklin		166	185	19	"	.0395	"	250	33	56	446			

OUTFALL NO. 22

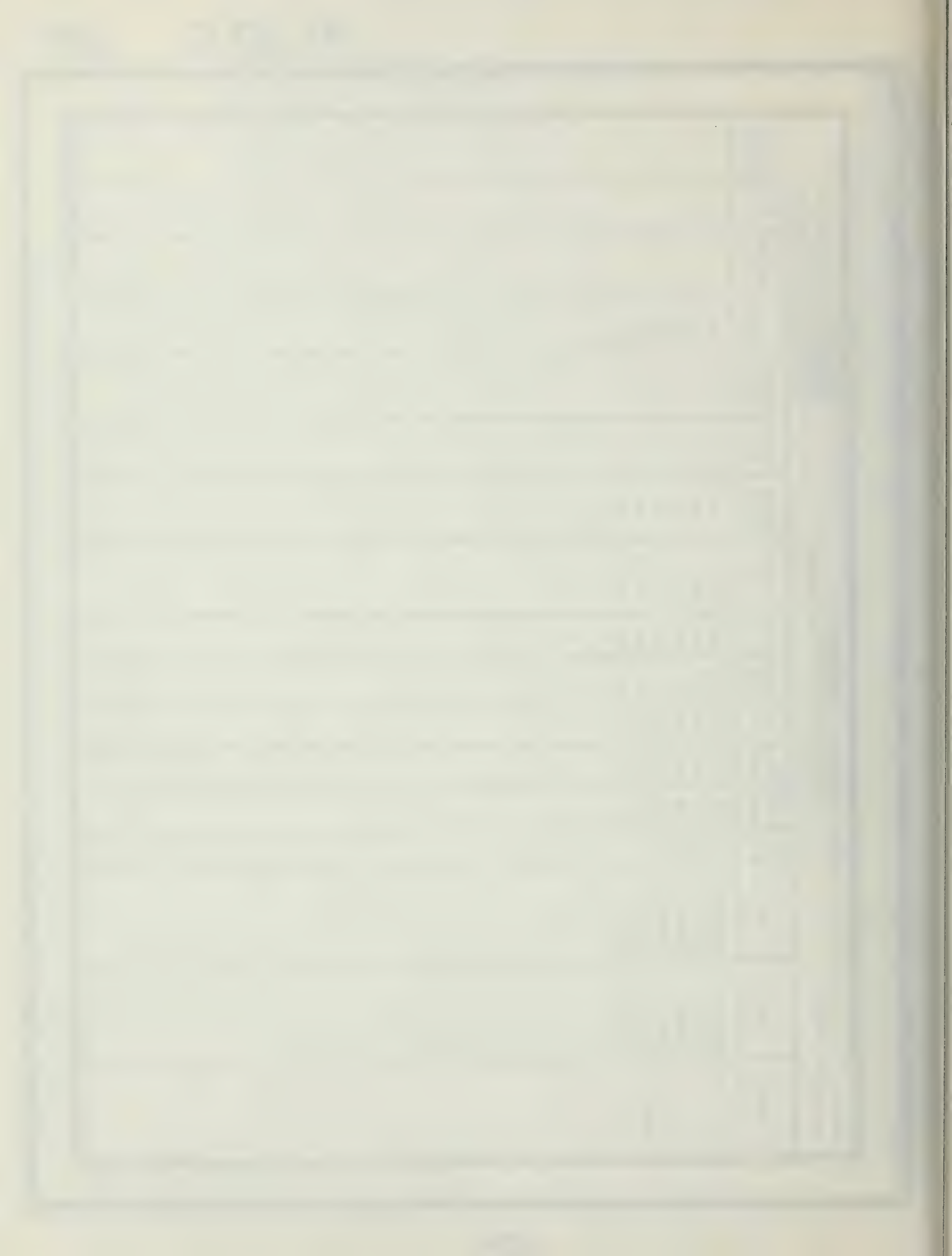
DISTRICT NO. 220 Continued

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
	Franklin	Gough		185	200	15	481	.0311	3'x5'	220	33	56	392			
	Gough	Octavia		200	220	20	"	.0415	3'x5'	260	23	40	650			
	Octavia	Laguna		220	240	20	"	.0415	3'x5'	260	15	28	930			
	Laguna	Buchanan		240	250	10	"	.0207	3'x5'	170	7	13	1300			
Broadway	Polk	Larkin		140	155	15	481	.0311	3'x5' Br.	220	36	86	256			
Larkin	Broadway	Vallejo		155	169	14	344	.0407	3'x5' Br.	250	31	74	338			

PLATE 24



OUTFALL NO. 24

DISTRICT NO. 241

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Embarcadero	Outfall	Weir	8	*-1.40	-0.40	1.0	155	.0065	6'x7'	440	334	485	91	84"	A- 33"	42.8
Beach	Grant	Stockton	14	-0.40	-0.10	0.30	310	.00074	5'x9'	160	334	460	35	120"	A-102"	250.0
	Stockton	Powell	14	-0.10	+0.25	0.35	480	"	5'x9'	160	319	460	35	120"	A-102"	387.0
	Powell	Mason	13	0.25	0.60	0.35	480	"	5'x9'	160	189'	403	40	114"	A- 87"	303.0
	Mason	Taylor	9	0.60	1.0	0.40	480	.00084	4'x6'	82	81	85	97	72"	A- 48"	171.0
Taylor	Beach	North Point		1.0	2.0	1	344	.0029	4'x6'	130	81	88	148			
	North Point	Bay	9	2	3.0	1	344	.0029	3'x4'-6"	60	77	85	70	54"	A- 33"	73.5
Bay	Taylor	Jones	8	3.0	12.50	9.5	480	.020	2'x3'	52	35	81	64	39"	A- 24"	86.8
Powell	Beach	North Point	11	0.25	2	1.75	344	.0051	3'x5'Br.	88	122	202	43	63"	R	150.2
	North Point	Bay	10	2	4	2.0	344	.0058	"	96	116	194	49	60"	R	79.2
	Bay	Francisco	12	4	5	1	344	.0029	"	70	109	186	28	75"	R	101.8
	Francisco	Chestnut	10	5	10	5	344	.014	"	150	79	183	81	51"	R	70.6
	Chestnut	Lombard		10	30	20	344	.058	"	310	75	177	175			
	Lombard	Greenwich		30	37	7	344	.020	"	180	71	169	197			
	Greenwich	Filbert		37	57	20	344	.058	"	310	65	160	194			
	Filbert	Union		57	70	13	344	.037	"	250	57	142	176			
	Union	Green		70	87	17	344	.049	"	290	20	51	570			
	Green	Vallejo		87	104	14	344	.041	"	260	17	42	620			
	Vallejo	Broadway		104	110	6	344	.017	"	170	14	33	515			
	Broadway	Pacific		110	115	5	344	.0146	"	155	14	33	470			
Mason	Beach	North Point	11	0.60	2.0	1.40	344	.0041	3'x5' Br.	80	145	198	40	63"&	R	150.2
	North Point	Bay	10	2.0	4	2.0	344	.0058	"	96	104	198	49	60"&	R	79.2
	Bay	Francisco	11	4	5	1	344	.0029	"	170	101	196	35	69"	R	91.2
	Francisco	Chestnut	10	5	8	3	344	.0087	"	120	95	189	60	57"	R	76.1
	Chestnut	Lombard		8	19	11	344	.032	"	230	76	155	122			
	Lombard	Greenwich		19	40	21	344	.061	"	320	58	122	180			
	Greenwich	Filbert		40	73	33	344	.10	"	400	43	93	370			
	Filbert	union		73	104	31	344	.093	"	397	28	61	367			
	Union	Green		104	152	48	344	.14	"	480	28	61	445			

PLATE 25

OUTFALL NO. 29

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Howard	Outfall	Steuart		-3.39	-2.96	.45	340	.0013	90"	280	205.7	265	106			
	Steuart	Spear		-2.96	-2.58	.38	357.5	.001	84"	210	163	216	97		OK	
	Spear	Main		-2.58	-2.00	.58	357.5	.0016	84"	250	155.1	213	117			
Main	Howard	Mission	7	-2.00	-0.06	1.94	632.5	.0031	4'x6'	130	99.9	170	77	60"	A-24"	156
Mission	Main	Beale	7	-0.06	2.33	2.27	357.5	.0064	3'-6"x5'-3"	135	96.7	168	80	54"	A-30"	92
	Beale	Fremont	7	2.27	5.42	3.15	357.5	.0088	3'x4'-6"	105	89.7	130	81	48"	A-30"	92
	Fremont	1st	8	5.42	8	2.58	357.5	.0073	3'x4'-6"	95	82.7	120	80	51"	A-33"	99
	1st	2nd	8	8	16.50	8.50	907.5	.0094	2'-6"x3'-9"	65	63.7	116	56	48"	A-36"	270
	2nd	New Montgomery	13	16.50	16.65	.15	282.5	.00055	3'x5' Br.	30	62.8	113	26	78"	R	91
	New Montgomery	3rd St.	13	16.65	17	.35	625	.00055	"	30	41.8	90	33	78"	R	201
	3rd	4th		17	24	7	907.5	.0077	"	110	25.2	59	186			
4th St.	Mission	Market		24	30	6	632.5	.0095	"	120	19.1	48	250			
Market	4th	O'Farrell & Grant		30	32.5	2.5	470	.0053	3'x5' Br. 24"	90	16	42.5	210			
Howard	Main	Beale		-2.00	2	4	357.5	.011	3'x5' Br.	130	46.7	108	120			
	Beale	Fremont		2	4	2	357.5	.0056	"	96	41.5	100	96		OK	
	Fremont	1st		4	8	4	357.5	.011	"	130	28	70	126			
1st	Howard	Tehama		8	15	7	210	.030	"	220	19.9	50.7	430			
	Tehama	Folsom		15	30	15	422	.035	"	235	14.4	36.2	650			
	Folsom	Harrison		30	80	50	632	.079	"	350	3.2	8.2	4300			
Steuart	Howard	Folsom	7	-2.96	-1.0	1.96	632	.0031	2'-6"x3'9"	37	22.2	54.5	68	42"	A-24"	158
Folsom	Steuart	Spear		-1.0	0	1	357.5	.0028	3'x5' Br.	64	16.6	41.5	152			
	Spear	Main		0	5	5	357.5	.014	"	150	9.4	24.4	610			
	Main	Beale		5	10	5	357.5	.014	"	150	1.3	3.4	4420			

OUTFALL NO.

DISTRICT NO. 352

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.C.L. ELEVATIONS LOWER	E.C.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
5th Street	Minna	Mission		15	18	3	220	.0136	63"	350	165	280	125			
	Mission	Jessie		18	20	2	220	.0091	63"	290	151	259	112			
	Jessie	Stevenson		20	22	2	190	.0105	63"	310	146	251	123			
	Stevenson	Market		22	24.4	2.4	348	.0069	63"	250	140	249	100			
	Market	Eddy		24.4	26	1.6	241	.0066	60"	215	117	212	101			
Anna Lane	Eddy	Ellis		26	28.6	2.6	389	.0067	60"	218	113	211	103			
Ellis	Anna Lane	Powell		28.6	30	1.4	208	.0067	60"	218	111	210	104			
Powell	Ellis	O'Farrell		30	44	14	344	.0407	3'x5'	212	107	205	103			
	O'Farell	Geary		44	58	14	344	.0407	"	212	83	161	132			
	Geary	Post		58	74	16	344	.0465	"	226	72	142	159			
Post	Powell	Mason		74	82	8	489	.0163	"	134	61	123	109			
Mason	Post	Sutter		82	115	33	344	.096	"	325	49	102	319			
	Sutter	Bush		115	156	41	344	.109	"	348	36	75	465			
Bush	Mason	Taylor		156	171	15	481	.031	"	185	33	70	264			
	Taylor	Jones		171	191	20	481	.0416	"	213	25	55	387			
	Jones	Leavenworth		191	210	19	481	.0395	"	207	15	34	609			
Leavenworth	Bush	Pine		210	240	30	344	.087	"	309	14	31	998			
	Pine	California		240	260	20	344	.058	"	253	12	29	872			
	California	Sacramento		260	290	30	344	.087	"	309	7	17	1815			
Market	5th	Turk		24.4	25.6	1.2	120	.01	"	105	21.3	45	233			
Turk	Market	Mason		25.6	26.7	1.1	110	.01	"	105	18.1	39	270			
Mason	Turk	Eddy		26.7	30	3.3	344	.0096	"	103	15.2	34	303			
	Eddy	Ellis		30	45	10	344	.029	"	179	11.4	26	690			
Ellis	Mason	Taylor		45	50	5	481	.0104	"	107	7.6	19	574			
	Taylor	Jones		50	60	10	481	.0208	"	151	3.8	10	1510			
O'Farrell	Powell	Mason		44	60	16	481	.0333	"	191	15.5	29.5	647			
	Mason	Taylor		60	65	5	481	.0104	"	107	11.8	26	411			
	Taylor	Jones		65	80	15	481	.0312	"	185	8.0	18.4	1000			
	Jones	Leavenworth		80	100	20	481	.0416	"	213	4.2	10.2	2100			
Leavenworth	O'Farrell	Geary		100	120	20	344	.058	"	253	2.8	7.0	3610			
	Geary	Post		120	150	30	344	.087	"	309	1.4	3.5	8800			
Geary	Powell	Mason		58	70	12	481	.025	"	166	7.5	18.7	890			
	Mason	Taylor		70	80	10	481	.0208	"	151	3.7	9.2	1650			
Post	Mason	Taylor		82	105	23	481	.047	"	228	7.6	19	1200			
	Taylor	Jones		105	128	23	481	.047	"	228	3.8	9.5	2400			
Sutter	Mason	Taylor		115	135	20	481	.0416	"	213	9.0	3.5	6100			
	Taylor	Jones		135	156	21	481	.0437	"	219	5.2	12.7	1720			
	Jones	Leavenworth		156	180	24	481	.05	"	234	1.4	21	1160			

PLATE 27

OUTFALL NO.

DISTRICT NO. 363 & 372

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
DISTRICT 363																
6th	Natoma	Minna	11	16	21	5	190	.0263	3'x5' Br.	171	301.9	408	42	60	R	75
	Minna	Mission	11	21	26	5	210	.0238	"	161	301.3	408	39	60	R	83
	Mission	Jessie	12	26	28	2	220	.0091	"	100	300.7	408	24	72	R	63
	Jessie	Stevenson	12	28	30	2	185	.0108	"	108	297.8	408	26	72	R	53
	Stevenson	Market	12	30	32	2	240	.0083	"	96.5	297	408	24	75	R	73
Taylor	Market	Turk	12	32	35.5	3.5	440	.008	no sewer	-	290.2	408	0	75	R	133
Turk	Taylor	Jones	11	35.5	40.5	5	481	.0146	3'x5' Br.	127	278.8	400	32	66	R	122
	Jones	Leavenworth	11	40.5	50	9.5	481	.0197	"	147	273.7	396	37	63	R	117
	Leavenworth	Hyde	11	50	60	10	481	.0208	"	151	261	385	39	60	R	112
	Hyde	Larkin	11	60	65	5	481	.0146	"	127	228.1	345	37	63	R	117
Larkin	Turk	Eddy	10	65	80	15	343	.0438	"	220	221.4	339	65	54	R	71
	Eddy	Ellis	11	80	83	3	343	.0087	"	97.5	201.3	315	31	66	R	87
	Ellis	O'Farrell	9	83	100	17	343	.0496	"	234	172.3	274	85	48	R	67
	O'Farrell	Geary		100	105	5	343	.0146	57	280	168.4	274	102			
	Geary	Post		105	115	10	343	.0292	54	340	150.2	246	138			
Post	Larkin	Polk	10	115	120	5	481	.0104	3'x5' Br.	107	107.4	182	59	51	R	99
Polk	Post	Sutter		120	134	14	343	.0408	"	212	74.6	128	166			
	Sutter	Bush		134	145	11	343	.032	"	187	71.2	124	151			
	Bush	Pine		145	152	7	343	.0204	"	150	65	116	129			
	Pine	California		152	160	8	351	.0228	"	159	51.9	95	167			
	California	Sacramento		160	170	10	342	.0292	"	180	35.8	68	264			
	Sacramento	Clay		170	175	5	323	.0155	"	130	18.5	36	360			
Leavenworth	Turk	Eddy		50	55	5	343	.0146	"	127	7.6	16	790			
	Eddy	Ellis		55	70	15	343	.0438	"	220	3.8	8.3	2650			
Hyde	Turk	Eddy		60	65	5	343	.0146	"	127	29	56	227			
	Eddy	Ellis		65	75	10	343	.0292	"	180	25.2	49	367			
	Ellis	O'Farrell		75	95	20	343	.0583	"	254	21.4	42.5	598			
	O'Farrell	Geary		95	110	15	343	.0437	"	220	15.2	30.8	715			
	Geary	Post		110	130	20	343	.0583	"	254	11.4	23.8	1065			
	Post	Sutter		130	160	30	343	.0875	"	310	7.6	16.2	1910			
	Sutter	Bush		160	195	35	343	.102	"	334	3.8	8.3	4020			
Ellis	Larkin	Polk		83	90	7	481	.0146	"	127	25.1	51.5	247			
	Polk	Van Ness		90	116	26	481	.0541	"	244	18.2	38.4	635			
Van Ness	Ellis	O'Farrell		116	130	14	343	.0408	"	212	3.9	8.6	2460			
Larkin	Post	Sutter		115	130	15	343	.0437	"	220	36.4	68.5	320			
	Sutter	Bush		130	154	24	343	.070	"	278	30	57.5	483			
	Bush	Pine		154	160	6	343	.0178	"	140	26.7	52.5	267			
	Pine	California		160	180	20	351	.057	"	250	15.3	30.8	810			
	California	Sacramento		180	200	20	342	.0583	"	254	11.5	23.7	1070			
Pine	Larkin	Hyde		160	205	45	481	.0936	"	322	7.6	15.5	2070			
Hyde	Pine	California		205	210	5	351	.0142	"	124	3.8	8.3	1490			
Taylor	Turk	Eddy		35.5	36.0	0.5	343	.00146	"	40	7.6	16.8	238			
Eddy	Taylor	Jones		36	38	2	481	.0041	"	66	3.8	9.5	695			
DISTRICT 372																
	Howard	Natoma		15	16.7	1.7	210	.0081	3'-6x5'-3	152	120.2	158	96			
7th St.	Natoma	Minna		16.7	17.3	1.7	190	.009	"	160	116.1	156	102			
	Minna	Mission		17.3	20	2.7	210	.0129	"	190	108.5	146	130			
	Mission	Jessie		20	23.4	3.4	220	.0156	"	207	99.3	133	155			
	Jessie	Stevenson		23.4	26.3	2.9	185	.0156	"	207	95.3	129	160			
	Stevenson	Market		26.3	29.2	2.9	185	.0156	"	207	88.2	119	174			
Market	7th St.	Jones		29.2	32.4	3.2	330	.0097	"	165	78.2	106	155			
McAllister	Jones	Leavenworth		32.4	37	4.6	481	.0096	3'x5'	103	71.8	100	103			

OUTFALL NO.

DISTRICT NO. 363 & 372

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
	Leavenworth	Midblock		37	40	3	240	.0125	3'x5' Br.	128	67.9	92	1132			
	Midblock	Hyde		40	43	3	241	.0125	42	117	67.9	97	120			
	Hyde	Larkin		43	47.5	45	481	.00935	3'x5' Br.	103	57.9	83.5	123			
	Larkin	Polk		47.5	54	6.5	481	.0135	36	80	468	73	109			
	Polk	Van Ness		54	59	5	481	.0104	36	70	42.6	69.5	101			
Van Ness	McAllister	Golden Gate		59	69	10	343	.0292	3'x5' Br.	180	28.5	47.5	380			
Golden Gate	Van Ness	Franklin		69	76	7	481	.0146	3'x5' Br.	127	10.5	18.4	690			
	Franklin	Gough		76	79	3	481	.00624	"	84	6.4	12.2	690			
	Gough	Octavia		79	81	2	481	.00416	"	66	2.8	6.2	1060			
McAllister	Van Ness	Franklin		59	62	3	481	.0062	"	84	9.9	19.8	424			
	Franklin	Gough		62	66	4	481	.0083	"	96	6.8	14.9	645			
Van Ness	Golden Gate	Turk		69	76	7	343	.0204	"	150	14.1	27	555			
Turk	Van Ness	Franklin		76	90	14	481	.0291	"	179	10.1	20.3	880			
	Franklin	Gough		90	94	4	481	.0083	"	96	7.1	15.6	610			

OUTFALL NO. 37

DISTRICT NO. 374

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick sewer.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Fell	MH betw. Gough and Octavia	Octavia		55	57	2	250	.008	81"	530	791	380	140			
Octavia	Fell	Grove		57	63	6	688	.0087	78"	500	774	372	135			
Grove	Octavia	Laguna		63	70	3	481	.0062	78"	420	734	375	112			
Laguna	Grove	Golden Gate		70	84	14	1,032	.0136	78"	620	717	385	160			
Golden Gate	Laguna	Webster		84	93	9	962	.0093	78"	520	692	408	127			
Webster	Golden Gate	Turk		93	96	3	344	.0087	78"	500	667	401	125			
Turk	Webster	Fillmore		96	99	3	481	.0062	78"	420	615	370	114			
	Fillmore	Steiner	7	99	102	3	481	.0062	72"	340	545	370	92	75"	A-30"	91
Steiner	Turk	Post	8	102	122	20	1,720	.0116	63"	340	450	395	86	69"	A-33"	360
Post	Steiner	Divisadero	8	122	130	8	1,443	.0055	3'-6"x5'-3"	123	186	203	60	63"	A-45"	273
Fell	Octavia	Laguna		57	69	12	481	.025	3'x5'Br.	200	17	23.5	850			
Hayes	Octavia	Laguna		60	66	6	481	.0125	3'x5'Br.	140	40	50	280			
Laguna	Hayes	Grove		66	70	3	344	.0087	3'x5'Br.	115	40	50	230			
Grove	Laguna	Webster		70	100	30	962	.031	3'x5'Br.	220	40	50	440			
Fulton	Laguna	Webster		74	92	18	962	.0187	3'x5'Br.	170	30	37.5	452			
McAllister	Laguna	Steiner		77	135	58	1,924	.030	3'x5'Br.	215	27	29.5	730			
Golden Gate	Webster	Steiner		93	112	19	962	.0197	3'x5'Br.	170	25	31.5	550			
Buchanan	Golden Gate	O'Farrell		87	125	38	1,376	.028	3'x5'Br.	210	42	46	455			
Webster	Turk	Sutter		96	132	36	2,064	.0174	3'x5'Br.	160	25	22	730			
Steiner	Post	Sutter		122	128	6	344	.0175	3'-6"x5'-3"	170	62	68	250			
	Sutter	Sacramento		128	174	46	1,376	.0335	3'x5'Br.	240	62	68	353			
Eddy	Steiner	Scott		106	138	32	962	.033	3'x5'Br.	238	15	21	1,130			
Ellis	Steiner	Divisadero		114	155	41	1,443	.0285	3'x5'Br.	210	32	40	550			
Geary	Steiner	Broderick		122	162	40	1,924	.0207	3'x5'Br.	180	48	54	343			
Sutter	Steiner	Broderick		128	141	13	1,924	.00675	3'x5'Br.	100	165	99	101			
	Fillmore	Steiner		126	128	2	481	.0041	3'x5'Br.	80	5	9.5	840			
	Fillmore	Webster		126	132	6	481	.0124	3'x5'Br.	138	15	20	690			
	Webster	Laguna		132	180	48	962	.05	3'x5'Br.	250	10	16	625			
Fillmore	Turk	Geary 1		99	117	18	1,376	.013	3'x5'Br.	140	70	64	220			
	Geary	Geary 2		117	137.2	20.2	920	.022	6'-4"x4'	360	65	61	590			
	Geary 2	Pine		137.2	160	22.8	1,032	.022	3'x5'Br.	180	55	46	390			

OUTFALL NO. 37

DISTRICT NO. 770

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Oak	Scott	Divisadero	8	165	172	7	481	.0146	3'x5' Br.	155	178	179	86	48"	A-24"	87.0
	Divisadero	Broderick		172	194	22	481	.0456	3'x5',3'x4'6 Br.	270	173	176	154			
	Broderick	Baker	9	194	202	8	481	.0166	3'x4'6,3'x5' Br.	165	169	175	94	48"	R	94.7
	Baker	Lyon	10	202	208	6	481	.0125	3'x5' Br.	142	165	175	81	51"	R	98.5
	Lyon	Central	9	208	215	7	481	.0146	3'x5' Br.	155	158	170	90	48"	R	94.7
	Central	Masonic		215	222	7	481	.0146	"	155	135	138	112			
	Masonic	Ashbury		222	228	6	481	.0125	"	142	112	104	136			
	Ashbury	Clayton		228	233	5	481	.0104	"	130	103	87	150			
	Clayton	Cole		233	238	5	481	.0104	"	130	103	87	150			
	Cole	Shrader		238	242	4	481	.0083	3'x4'-6"	100	156	99	101			
	Shrader	Stanyan	7	242	245	3	481	.0064		90	151	101	89	45"	A-21"	62.3
Stanyan	Oak	Page		245	252	7	344	.020	3'x4'-6"	160	148	100	160			
	Page	Haight		252	255	3	344	.0087	"	105	144	98	107			
	Haight	Waller		255	259	4	344	.0116	"	120	140	95	126			
	Waller	Beulah	8	259	262	3	344	.0087	2'x3'	34	131	186	18	54"	A-36"	74.4
	Beulah	Frederick	9	262	268	6	344	.0175	"	49	125	190	26	48"	A-42"	60.2
	Frederick	Carl	7	268	300	32	344	.093	"	112	109	165	68	33"	A-24"	61.0
	Carl	Parnassus	7	300	325	25	344	.072	"	100	100	153	65	27"	A-24"	61.0
	Parnassus	Grattan		325	344	19	344	.055	2'x3'	86	50	76	113			
Scott	Oak	Fell		165	176	11	309	.035	81"	1,000	592	595	168			
Fell	Scott	Divisadero	8	176	181.5	5.5	488	.011	81"	620	585	650	95	84"		
	Divisadero	midblock	9	181.5	184.25	2.75	244	.011	66"	340	431	445	76	72"	A-42"	42.7
	midblock	Broderick	12	184.25	187	2.75	244	.011	4x5	340	431	445	76	72"	R	69.6
	Broderick	Baker	10	187	199	12	481	.025	4'x5' Br.	360	426	431	83	63"	R	114.7
	Baker	Lyon	12	199	205	5	481	.012	"	250	418	435	57	72"	R	137.0
	Lyon	Central	11	205	212	7	481	.0146	"	280	414	439	64	69"	R	127.5
	Central	Masonic	11	212	219	7	481	.0146	"	280	404	437	64	69"	R	127.5
	Masonic	Ashbury	11	219	227	8	481	.0166	"	300	398	440	68	66"	R	121.5
	Ashbury	Clayton	12	227	230	3	481	.00622	"	180	391	440	41	78"	R	152.2
	Clayton	Cole	12	230	234	4	481	.0083	"	210	373	435	48	78"	R	152.2
Cole	Fell	Oak	9	234	238	4	344	.016	3'-6"x5'0"	285	345	396	72	66"	A-42"	60.2
	Oak	Page	10	238	253	15	344	.043	3'x5' Br.	250	175	396	64	54"	R	71.3
	Page	Haight	10	253	258	5	328	.015	"	150	171	396	39	66"	R	81.6
	Haight	Waller	10	258	264	6	260	.023	"	180	165	390	36	60"	R	59.5
	Waller	Beulah	10	264	269.5	5.5	344	.016	"	160	114	306	52	60"	R	78.6

OUTFALL NO. 37

DISTRICT NO. 770

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick Sewer

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
	Beulah	Frederick	9	269.5	275	5.5	344	.016	3'x5' Br.	160	108	202	80	51"	R	68.8
	Frederick	Carl		275	290	15	344	.043	"	260	104	195	132			
	Carl	Parnassus	8	290	295.3	5.3	344	.0154	2'-6"x3'-9"	90	68	118	76	42"	A-27"	63.8
	Parnassus	Grattan	8	295.3	296.8	1.5	314	.0048	2'-6"x3'-9"	50	53	100	50	48"	A-39"	53.4
	Grattan	Alma	8	296.8	305.8	9	310	.029	27" Br.	54	41	77	70	30"	R	60.2
Divisadero	Oak	Fell		172	176	4	344	.0116	3'x5' Br.	140						
	Fell	Hayes		176	191	15	344	.044	3'x5' Br.	270	164	254	106			
	Hayes	Grove	10	191	195	5	344	.0146	"	155	153	242	64	54"	R	71.4
	Grove	Fulton	8	196	201	5	344	.0146	3'-0"x4'-6"	155	147	238	65	54"	A-36"	74.4
Fulton	Divisadero	Broderick	9	190	196	6	481	.0125	3'x4'-6"	132	141	237	55	54"	A-42"	84.2
	Broderick	Baker	10	196	200	4	481	.0083	"	100	132	230	57	60"	A-48"	97.0
	Baker	Lyon	8	200	208	8	481	.0168	"	145	117	215	67	51"	A-33"	99.2
	Lyon	Central	9	208	212	4	481	.0083	"	100	97	182	55	54"	A-42"	84.2
	Central	Masonic	8	212	217	5	481	.0106	2'-6"x3'-9"	70	66	123	58	42"	A-33"	99.2

PLATE 32

OUTFALL NO. 38, 39

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
OUTFALL 38																
6th St.	Outfall	Owens		-3.42	-2.96	.66	100	.0046	3'-6"x5'-3"	114	62.7	114	100			
	Owens	Irwin	-	-2.96	-2.20	.76	450	.0017	3'x4'-6"	45	13.6	27.4	164			
	Irwin	Hubbell		-2.20	-1.80	.40	310	.0013	2'-6"x3'-9"	24	10.9	24	100			
	Hubbell	Daggett	-	-1.80	+0.40	2.20	310	.0071	"	56	8.2	19	295			
OUTFALL 39																
4th St.	Outfall	Hooper	10	.2	-1.51	.49	305	.0016	2'-6"x3'-9"	27	102	130	21	66"	A-60"	119
	Hooper	Irwin	10	-1.51	-1.01	.50	310	.0016	"	27	81.5	110	24	60"	A-57"	118
	Irwin	3rd	9	-1.01	- .34	.67	416	.0016	"	27	69	100	27	60"	A-54"	151
3rd St.	4th St.	½ way to Merrimar	9	- .34	.23	.57	383	.0015	2'-6"x3'-9"	26	40.5	70	37	54"	A-45"	122
		Merrimar	9	.23	.88	.65	433	.0015	2'x3'	14	"	70	20	54"	A-48"	155
	Merrimar	Alameda	8	.88	1.51	.63	416	.0015	"	14	26	49	29	45"	A-42"	126

OUTFALL NO. 40

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUNOFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Mariposa branch	Outfall	Junction @ Illinois	9	- 2.4	- .53	1.87	450	.0041	72"	280	240.5	380	74	81"	A-51"	162
	Illinois	Third	8	- .53	5	5.53	250	.022	3'x4'-6"	165	190.5	305	54	57"	A-42"	76
Third St.	Mariposa	18th St.	8	5	10	5	450	.0107	2'-6"x3'-9"	70	98.1	160	44	51"	A-36"	134
	18th St.	19th St.	8	10	18.5	8.5	450	.0189	"	100	43.9	155	64	45"	A-30"	118
	19th St.	20th	8	18.5	20	1.5	450	.0033	3'6"x5'-3"	96	89.7	155	62	60"	A-42"	81
	20th St.	22nd	8	20	23	3	900	.0033	3'-6"x5'-3"	96	83.4	155	62	60"	A-42"	161
22nd St.	Third	Tennessee	8	23	24	1	280	.00357	3'-6"x5'-3"	100	82.5	155	64	60"	A-42"	50
	Tennessee	Minnesota	8	24	25	1	280	.00357	"	100	78.9	152	66	60"	A-42"	50
	Minnesota	Indiana	9	25	26	1	280	.00357	3'x4'-6"	66	75.3	148	44	60"	A-48"	55
	Indiana	Iowa		26	31	5	280	.0178	"	145	69	140	103			
	Iowa	Pennsylvania	8	31	36	5	280	.0178	2'-6"x3'-9"	96	61.8	120	80	42"	A-24"	51
	Pennsylvania	Mississippi		36	40	4	280	.0143	2'x3'	48	22.8	46.5	103			
Pennsylvania	22nd St.	½ way to 23rd St.		36	65	29	431	.067	2'x3'	102	28	56	182			
Mariposa	Third	Tennessee	8	5	10	5	280	.018	2'-6"x3'-9"	97	85.1	162	60	45"	A-33"	58
	Tennessee	Minnesota	8	10	12	2	280	.0071	2'-6"x3'-9"	61	80.7	156	39	54"	A-45"	53
	Minnesota	Indiana	8	12	15.5	3.5	280	.0125	2'x3'	44	53	102	43	42"	A-33"	58
Illinois (N. of Mariposa)	Mariposa	17th St.		- .53	- .04	.48	480	.001	3'x4'-6"	34	29.4	32.8	103			
	17th St.	16th St.		- .04	.92	.96	480	.002	2'-6"x3'-9"	32	22.5	27	118			

OUTFALL NO. 42

DISTRICT NO. 420

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Third St.	Outfall	Diversion Structure (at Marin St.)		-2.7	-2.2	.5	503	.001	3'-6"x5'-3"	52	153	146	36	72"	A-60"	205
	Diversion Structure (Marin St.)	Army		-2.0	+1.1	3.1	512	.006	"	130	132	130	100			
	Army	26th St.	8	1.1	2.5	14	433	.0032	3'x4'-6"	64	120	122	53	54"	A-42"	135
	26th	25th	7	2.5	4.4	1.9	465	.004	"	70	70	103	68	45"	A-33"	130
	25th	24th	8	4.4	6.3	1.9	466	.004	"	70	61	93	75	48"	A-30"	125
	24th	23rd	8	6.3	9.0	2.7	494	.0055	"	82	50	82	100			
Marin	Third	Illinois		-2.0	-1.4	.6	290	.002	"	50	18	29	170			
	Illinois	Michigan		-1.4	-.2	1.2	280	.004	30"	26	15	26	100			
26th	3rd	Tennessee		+2.5	2.7	.2	280	.0005	54"	44	43	44	100			
Tennessee	26th	25th		2.7	2.9	.2	466	.0005	54"	39	33	39	100			
	25th	24th		2.9	3.0	.1	466	.0003	54"	37	28	37	100			
24th	Tennessee	Minnesota		3.0	3.1	.1	280	.0003	54"	35	24	35	100			
Minnesota	24th	23rd		3.1	4.0	.9	466	.0018	36"	28	17	28	100			

OUTFALL NO. 43

DISTRICT NO. 430

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
DISTRICT 430 MARIN	Outfall	10' TAPER (240'E C/L of Evans)	13	-1.017	+ .243	1.26	800	.00159	8'X 10'	600	1400	1200	50	2-117"	A-2(90")	1,040
	10' TAPER (240'E C/L of Evans)	1st Bend @ Evans	13	.243	.592	.341	208	.00164	8.5'X 10.5'	600	1400	1200	50	2-114"	A-2(90")	270
	1st Bend @ Evans	2nd Bend @ Evans	13	.592	.825	.151	92	.00164	8.5'X 10.5'	600	1400	1200	50	2-114"	A-2(90")	120
	2nd Bend @ Evans	10'TAPER (300' W C/L Evans)	13	.825	1.325	.418	255	.00164	8.5'X 10.5'	600	1400	1200	50	2-114"	A-2(90")	331
	10' TAPER(300'W C/L EVANS)	Junction Struct	13	1.325	1.759	.434	273	.00159	8'X 10'	600	1400	1200	50	2-117"	A-2(90")	355
	Junction Struct	10' TAPER (435 W of Junction)		1.759	5.619	2.78	435	.0064	8'X 10'	1200	1240	1200	100			
	10' TAPER (435 W of Junction)	10' TAPER (785 W of Junction)		5.619	7.929	2.31	350	.00658	8.5'X 10.5'	1200	1240	1200	100			
	10' TAPER (785 W of Junction)	Control Pt (30' E of Kansas FL		7.929	8.18	.255	40	.00638	8'X 10'	1200	1240	1200	100			
	Control Pt (30'E of Kansas FL	Transition Struct		8.18	11.66	3.48	600	.0058	12'-6"X7'-6"	1392	1025	1180	112			
ARMY	Transition Struct	Hampshire E P/L		11.66	16.00	4.34	750	.0058	9' X 11"	1550	1025	1180	113			
	Hampshire	Alabama	12	16	23.8	7.8	1240	.0063	8'6"X 7'0"	680	1023.5	1010	67	2-81"	A-72"	353
	Alabama	Folsom	12	23.8	29.0	5.2	880	.0059	8'6"X 7'0"	650	967.1	986	66	108	A-72"	251
	Folsom	Shotwell	12	29	32	3	410	.0073	84"	550	930	980	56	105	A-78"	130
	Shotwell	Mission	10	32	53.0	21	970	.021	78"	780	9243	977	80	87	A-48"	195
	Mission	Valencia	12	53.0	60.8	7.8	550	.0142	72"	520	880.6	943	55	90"	A-69"	149
POTRERO	Army	Angle MH pts		16	19	3	265	.0113	39"	90	65.11	84	107			
	Angle MH pts	25th		19	29	10	667	.015	36"	84	59.16	79	106			
KANSAS	Marin	Army		8.18	8.74	.559	397	.00141	10'X 7'	389	130.1	202	192.5			
ARMY	Kansas	Vermont		8.74	9.40	.66	470	.0014	10'X 7'	389	127.8	202	192.5			
VERMONT	Army	San Bruno		9.4	13.5	4.1	200	.0204	3'X 4'6"	160	99.8	160	100			
DISTRICT 432 ARMY	Valencia	San Jose	11	60.8	65.9	5.1	330	.0154	72"	540	769.6	815	66.2	84"	A-57"	74
	San Jose	Guerrero		65.9	70.0	4.1	330	.0123	78"	600	508.1	540	110			
GUERRERO	Army	27th		70.0	76.75	6.75	292	.023	78"	820	479.6	514	159.5			
27th	Guerrero	Dolores		76.75	86.00	9.25	661	.014	78"	640	471.9	517	124			
27th	Dolores	Church		86.00	109.5	23.5	661	.0355	78"	1000	461.8	520	192			

OUTFALL NO. 43

DISTRICT NO. 432 Cont'd

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
DISTRICT 432 Cont'd																
CHURCH	27th	Army		109.5	113.3	3.8	292	.013	78"	620	437.7	495	125			
	Army	26th		113.3	117.0	3.7	292	.0127	78"	601	427.0	490	122			
	26th	Clipper	10	117.0	126	3.0	292	.0103	69"	379	396.8	459	85	72"	A-36"	65
	Clipper	25th		120	130.0	10.0	292	.034	69"	740	381.3	445	166.3			
25th	Church	Sanchez		130.0	140	10.0	643	.0156	72"	540	353.9	423	128			
Sanchez	25th	Jersey		140	144	4.0	292	.0137	72"	510	299.3	368	185			
Jersey	Noe	Sanchez		144	158	14	643	.0218	60"	410	289.2	358	115			
Noe	Jersey	24th		158	170	12	292	.0411	54"	350	272.7	346	101			
24th	Noe	Castro	10	170	185	15	643	.0233	3' X 5'	182	252.3	325	129			
24th	Castro	Diamond		185	222	37	643	.0576	3' X 4'-6"	290	206.2	270	107.5			
24th	Diamond	Douglass	9	222	266	44	643	.0685	2'-6"X 3'-9"	178	165.0	216	82.3	39"	A-21"	85
TIFFANY AVE SEWER																
Valencia	Army	Tiffany	10	60.8	62.8	2	470	.00425	3' X 4'-6"	72	95.7	139	51.8	54"	A-42"	87
Tiffany	Valencia	29th		62.8	81.8	19	1100	.0172	3' X 5'	157	88.5	137	114.5			
29th	Tiffany	Mission	10	81.8	88.8	7	300	.0233	2'-6"X 3'-9"	103	86.6	136	75.8	42"	A-24"	56
Mission	29th	Virginia	10	88.8	96.5	7.7	350	.0220	2'-6"X 3'-9"	100	84.5	136	73.6	42"	A-18"	45
SAN JOSE BRANCH																
San Jose	Army	27th	10	65.9	68.4	2.5	180	.0139	4' X 6'	282	259.5	355	79.5	66"	A-36"	40
	27th	Valley	10	78.4	82.4	14	1080	.013	4' X 6'	270	246.0	356	75.8	66"	A-39"	191
	Valley	29th	10	82.4	85.9	3.5	270	.013	4' X 6'	270	237.4	348	77.7	63"	A-36"	60
29th	San Jose	Dolores		85.9	99.2	13.3	525	.0253	3' X 5' & 3'-6"X 5'-3"	190	112.2	161	118.0			
	Dolores	Church		99.1	115.9	16.7	661	.0253	3' X 4'-6"	175	107.8	161	108.7			
	Church	Sanchez		115.9	140.9	25.0	643	.0389	3' X 4'-6"	220	83.4	128	172			
30th Street	Deep manhole	San Jose manhole		100.6	104	3.6	33	.109	36"	230	101.74	147	156			
	San Jose manhole	Dolores		104	115	11	240	.0458	33"	114	80.74	118	97			
	Dolores	Chenery		115	123	8.3	430	.0185	39"	114	75.72	114	100			

OUTFALL NO. 44

DISTRICT NO. 440

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
	Outfall	Selby and Napoleon	13	-.6	.04	.64	250	.002	3 comp. 7'-6"x10'	1800	3858	2700	67	(3) 135"	A-(3)87"	477
Selby	Napoleon	Evans	13	.04	.75	.71	400	.00178	"	"	3796	"	"	"	"	762
	Evans	Galvez	13	.75	1.75	1.0	560	"	"	"	3715	"	"	"	"	1070
	Galvez	Hudson	13	1.75	2.25	.5	280	"	2 comp 8'-6"x11-0"	1620	"	"	64	"	A-(3)93"	560
	Hudson	Innes	13	2.25	2.75	.5	"	"	"	"	"	"	"	"	"	"
	Innes	Jerrold	13	2.75	3.25	.5	"	"	"	"	"	"	"	"	"	"
	Jerrold	Kirkwood	13	3.2	3.75	.5	"	"	"	"	"	"	"	"	"	"
	Kirkwood	McKinnon	13	3.75	4.25	.5	"	"	"	"	"	"	"	"	"	"
	McKinnon	Newcomb	13	4.25	4.75	.5	"	"	"	"	"	"	"	"	"	"
	Newcomb	Oakdale & Industrial	13	4.75	5.25	.5	"	"			3578	"	"	"	"	"
Industrial	Oakdale	Palou	13	5.25	5.87	.62	350	.00178	2 comp. 8'-6"x11'	1620		2700	"	"	"	700
	Palou	Quesada	13	5.87	6.49	.62	350	"	"	"	"		"	"	"	700
	Quesada	Revere	13	6.49	7.11	.62	350	"	"	"	"		"	"	"	700
	Revere	1/2 Blk to Shafter	13	7.11	7.33	.22	125	"	"	"	"		"	"	"	250
	1/2 Blk to Shafter	Shafter	13	7.33	7.55	.22	125	"	"	"	"	2700	"	"	"	250
	Shafter	Charter Oak	13	7.55	8.08	.53	300	"	"	"	3445		"	"	"	600
	Charter Oak	Channell	13	8.08	8.43	.35	200	"	"	"	"	"	"	"	"	400
	Channell	Bayshore	13	8.43	9.25	.82	450	"	"	"	3386	"	"	"	"	900
Easement (Alemany Blvd)	Bayshore & Industrial	Berneveld (Ext'd) West side freeway	13	9.25	10.58	1.33	750	"	"	"	3248	2700	"	"	"	1490
Napoleon	Selby	Evans & Toland		.04	1	.96	600	.00166	60" (piles)	110	62	76	145			
	Evans & Toland	2'-6"x3'-9"sewer (transition)	7	1	2	1	450	.0022	3'x4'-6"	52	43	56	93	45"	A-18"	104
	Transition	Jerrold	7	2	5	3	1350	.0022	2'-6"x3'-9"	32	29	38	84	39"	"	315
Oakdale	Selby & Industrial	Toland	11	5.25	5.625	.375	600	.00062	3'x4'-6"	31	137	131	24	78"	A-69"	160
	Toland	Berneveld	11	5.625	6.030	.405	650	.00062	"	31	130	131	24	78"	A-72"	182
	Berneveld	Loomis	10	6.030	6.25	.22	350	.00062	"	31	114	108	29	72"	A-63"	84
	Loomis	Patterson	9	6.25	7	.75	200	.00375	"	41	105	95	43	51"	A-42"	37
	Patterson	Bayshore & Joy	9	7	7.75	.75	200	.00375	2'x3'	23	105	95	24	51"	A-45"	39
Bayshore	Joy	Faith	8	7.75	8.5	.75	200	.00375	"	23	75	44	52	39"	A-30"	39
	Faith	Costa	8	8.5	9.44	.94	250	.00375	"	23	74	46	50	39"	A-30"	48
	Costa	Rutledge	7	9.44	10	.56	150	.00375	"	23	64	25	92	30"	A-12"	16
Waterloo Sewer	Charter Oak & Industrial	Loomis & Waterloo	10	8.08	8.972	.892	350	.00255	2'-6"x3'-9"	34	105	180	19	69"	A-60"	80
Waterloo	Loomis	Bayshore	10	8.972	10	1.02	400	.00255	"	34	105	180	19	69"	A-60"	92
Bayshore	Waterloo	Cortland	7	10	11.76	1.76	100	.0176	3'x4'-6"	150	105	173	87	48"	A-24"	18
Cortland	Bayshore	James Lick	7	11.76	21	9.24	525	.0176	"	150	97	162	93	45"	A-18"	66
Bayshore	Industrial	Helena	8	9.25	12	2.75	720	.00383	2'-6"x3'-9"	42	45	78	54	45"	A-36"	156

PLATE 38

OUTFALL NO. 44

DISTRICT NO. 441 & 442

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Alemany Blvd.	Barneveld (ext.)	Nevada	13	10.58	14.5	3.92	1000	.0039	8'-6½"X 12'	1070	3128	2660	40	(2) 132"	A-(3)96"	2,100
	Nevada	Arnold Ave.(ext.	13	14.5	30	15.5	2520	.0052	8'-6½"X 12'	1350	2934	2660	51	(2) 123"	A-(2)93"	3,350
	Arnold (ext.)	Stoneyford (ext. (Junction Struc.		30	61	31	450	.069	8'-1½"X10'3"	3550	2892	2660	134			
	Stoneyford (ext.)	Benton Way (ext. (Junction Struc.		61	91	30	1900	.0158	(2)6'X 10'6"	2780	2828	2630	105			
Alemany Line	Benton Way (ext.)	Mission		91	98.7	7.7	446		7'-6"X 8'-3"	1350	1293	1317	103			
Cayuga line	Benton Way (ext.)	Viaduct	13	91	92	1	265	.0038	8'-1½"X10'3"	835	1535	1385	62	(2) 102"	A-96"	114
Viaduct (across Mission)	E.P.L.	W.P.L.			92.73	.73	126	.0058	10'-6"X 14'	2100	1496	1360	154			
	W.P.L. Mission	Milton & Cayuga		92.73	94	1.27	48	.0265	7' X 9'	1450	1479	1360	105			
Cayuga	Milton	Rousseau	9	94	95	1	250	.004	108"	800	1479	1360	54	(2) 102"	A-96"	107
Barneveld sewer (extended)	Alemany (near farmer's market)	Junction near Richard &Barneveld		10.58	11	.42	670	.007	3'X 4'-6"	100	60	99	101			
Crescent Ave. Sewer	Alemany	Crescent		14.5	15.42	.92	180	.0052	2'6"x 3'9" & 45"	140	97	141	100			
Crescent	Junction W. of Nevada	Prentiss	8	15.42	22.65	7.23	100	.00723	45"	110	93	138	80	51"	A-30"	19
	Prentiss	Banks		22.65	34.99	12.34	140	.088	36"	160	87	129	124			
	Banks	40' W. of Banks		34.99	39.48	4.49	40	.112	36"	130	80	120	108			
District No. 442																
Alemany	Mission	Rousseau		98.7	101.0	2.3	156	.0146	7'6"X 8'3"	1330	1293	1317	101			
	Rousseau	Lyell		101	108.4	7.4	505	.0146	7'6"X 8'3"	1330	1172	1317	101			
	Lyell	Tingley		108.4	122.8	14.4	990	.0146	7'6"X 8'3"	1330	1148	1317	101			
	Tingley	Harrington		122.8	142.25	19.45	1314	.0148	7'-6"X 9'-3"	1410	1135	1317	107			
	Harrington	Ocean		142.25	145.4	3.15	830	.0038	9' X 11'	1320	1135	1317	100			
	Ocean	Onondaga		145.4	152.7	7.3	897	.00813	9' X 9'-6"	1500	1125	1317	114			
	Onondaga	Junction with 90" sewer (near Junior Terrace)		152.7	164.6	11.9	866	.01375	96"	1070	761	996	107			
	Junction with 90" sewer	Geneva		164.6	185.35	20.75	875	.0232	90"	1168	752	996	117			

OUTFALL NO. 44

DISTRICT NO. 441 & 442

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.
Br. : Brick sewer.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Rosseau (Extended)	Alemany	S.E.Alemany		98.7	99.2	0.5	25	.02	45"	175	103	160	109			
	S.E.Alemany	Mission & Trumbull		99.2	123	23.8	80	.297	2'-6x3'-9"	400	103	160	250			
Mission	Trumbull	Ney	8	123	133	10	350	.0285	"	112	98	155	72	42"	A-27"	65
	Ney	Maynard	8	133	143	10	353	.0283	"	112	93	149	75	42"	A-24"	64
	Maynard	Silver	8	143	148	5	220	.0227	"	102	87	141	72	42"	A-27"	41
Silver	Mission	Lisbon		148	172	24	750	.032	2'x3'	70	41.6	70.5	100			
Lisbon	Silver	Peru		172	179	7	120	.058	"	90	34	54	166			
Onondaga	Alemany	Mission		152.7	159	6.3	370	.017	60"	350	360.1	364	96			
Mission	Onondaga	France	8	159	162	3	475	.0063	3'x4'-6"	88	145	149	59	54"	A-39"	81
	France	Italy	7	162	165	3	625	.0048	"	77	130	137	60	54"	A-39"	107
	Italy	Seneca	7	165	166.3	1.3	250	.0054	"	82	125	135	61	54"	A-39"	43
	Seneca	Amazon		166.3	168	1.7	300	.0054		82	122	135	61	54"	A-39"	51
										185	109	120	154			
Amazon	Mission	London		168	179	11	280	.039	"	128	106	116	110			
	London	Paris		179	189	10	280	.0357	2'-6"x3'-9"	132	101	111	119			
	Paris	Lisbon		189	200	11	280	.0393	"	105	93	102	103			
	Lisbon	Madrid		200	207	7	280	.025	"	105	86	94	112			
	Madrid	Edinburgh		207	214	7	280	.025	"	113	75	80	152			
	Edinburgh	Naples		214	222	8	280	.0285	"	98	62	64	153			
	Naples	Vienna		222	228	6	280	.0215	"	80	50	50	160			
	Vienna	Athens		228	232	4	280	.0143	"							
Mission	Onondaga	Russia	11	159	160	1	200	.005	3'-6"x5'-3"	120	206	228	53	66"	A-51"	42
	Russia	Persia	10	160	164	4	840	.0047	"	114	156	197	58	63"	A-45"	164
Persia	Mission	London	9	164	182.5	18.5	280	.066	2'-6"x3'-6"	155	147	197	80	39"	R	49
	London	Paris	9	182.5	197.5	15	"	.0535	"	140	143	193	72	39"	R	49
	Paris	Lisbon	9	197.5	208.5	11	"	.0393	"	120	139	191	63	42"	R	51
	Lisbon	Madrid	9	208.5	218.5	10	"	.0375	"	118	129	179	66	42"	R	51
	Madrid	Edinburgh	9	218.5	230.5	12	"	.043	"	128	117	165	72	39"	R	49
	Edinburgh	Naples	8	230.5	246.5	16	"	.057	"	145	107	153	95	36"	R	60
	Naples	Vienna	8	246.5	257.5	11	"	.0393	"	120	98	142	85	36"	R	60
	Vienna	Athens	8	257.5	271.5	14	"	.050	2'x3' Br.	84	90	131	64	36"	R	60
	Athens	Moscow	8	271.5	282	10.5	"	.0375	"	72	77	114	63	36"	R	60

PLATE 40

OUTFALL NO. 44

DISTRICT NO. 443, 444

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
District 443																
Cayuga	Rousseau	Lyell		95	98.3	3.3	500	.0066	108"	1.050	1479	1360				
	Lyell	Danton	9	98.3	100	1.7	250	.0066	102"	900	957	1005	89	108"	A-48"	49
Lyell	Cayuga	Lyell Junction		98.3	110	11.7	263	.044	63"	630	513	514	122			
	Lyell Junction	Arlington		110	137	27	792	.034	63"	560	508	514	109			
	Arlington	Diamond		137	157	20	379	.052	60"	620	472	481	129			
	Diamond	Brompton		157	163	7	227	.0309	60"	470	371	392	120			
	Brompton	Lippard		163	173	10	282	.0354	60"	500	343	378	132			
	Lippard	Chilton		173	180	7	252	.0278	60"	450	343	378	119			
	Chilton	Hamerton		180	186	6	257	.023	60"	400	343	378	106			
	Hamerton	Burnside		186	1917	5.6	262	.021	60"	390	343	378	103			
	Burnside	Mizpah (Extd)		191.7	203	11.3	281	.04	60"	540	343	378	143			
	Mizpah	Elk		203	209	6	181	.033	60"	490	321	349	140			
Diamond	Easement	Chenery	8	168	170	2	200	.01	2'x3'	36	71	82	44	39"	A-33"	41.5
District 444																
Cayuga	Danton	Gorham		100	105.4	5.4	700	.0077	102"	970	957	1005	96.5		OK	
	Gorham	Santa Rosa	9	105.4	115	9.6	1250	.0077	96"	820	957	1005	81.5	105"	A-57"	271
	Santa Rosa	San Juan		115	122	7	850	.0082	84"	600	491	536	112			
Santa Rosa	Cayuga	San Gabriel	9	115	132.5	17	785	.0217	4'x6'	350	449	602	58.2	72"	A-51"	158
Santa Rosa (3'-6"x5'3" line)	San Gabriel	San Jose		132.5	147	14.5	325	.0445	3'-6"x5'3"	350	77.5	100	350			
Santa Rosa 66" line	San Gabriel	Freeway East		132.5	157.2	24.7	607	.0406	66"	690	336	468	147			
Under Freeway	Freeway East	Freeway West		157.2	166.5	9.3	229	.0406	66"& 3'-6"x5'3"	1020	336	468	218			
Circular	Freeway West	Congo	8	166.5	172.2	5.7	120	.0477	3'-6"x5'-3"	360	294	412	87.5	54"	A-27"	22
Congo	Circular	Flood	8	172.2	177	4.8	100	.0477	3'-6"x5'-3"	360	294	412	87.5	54"	A-27"	19
Flood	Congo	Detroit		177	205	28	676	.0414	3'-6"x5'-3"	340	271	389	87.5	54"	A-27"	126
Flood	Detroit	Edna	8	205	243	38	635	.0598	3'x4'-6"	270	262	384	70	51"	A-33"	132
Edna	Flood	Hearst		243	273	30	288	.104	3'x4'-6"	350	248	366	95.6		OK	
Hearst	Edna	Foerster	8	273	302	29	663	.0437	3'x4'-6"	230	219	331	69	51"	A-33"	137
Hearst	Foerster	Gennessee	7	302	336	34	678	.0501	2'x3'	90	74	123	73	36"	A-21"	88
Hearst	Gennessee	Ridgewood	7	336	366	30	657	.0457	2'x3'	85	57	99	86	33"	A-21"	85
Foerster	Hearst	Joost	8	302	331	29	600	.0483	2'x3'	87	114	164	53	39"	A-30"	116
	Joost	Melrose	7	331	360	29	600	.0483	2'x3'	87	105	155	56	39"	A-27"	109

PLATE 41

OUTFALL NO. 44

DISTRICT NO. 444

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Foerster	Hearst	Staples		302	309.3	7.3	560	.0131	2'x3'	45	21.5	26	173			
Staples	Foerster	Gennessee		309.3	318	8.7	660	.0131	2'x3'	45	17.5	21	214			
District 445																
Cayuga	San Juan	Santa Ynez		122	127.3	5.3	446	.0114	78"	580	487	536	108			
	Santa Ynez	Ocean		127.3	129	1.7	142	.012	78"	590	465	520	113			
	Ocean	Onondaga		129	139	10	577	.0172	78"	700	453	510	137			
	Onondaga	Oneida	8	139	142	3	436	.0069	72"	360	336	388	93	75"	A-30"	84
	Oneida	Geneva	9	142	152	10	1223	.0087	66"	310	310	378	82	72"	A-39"	213
	Geneva	Mt. Vernon		152	167	15	900	.0167	66"	440	279	352	125			
	Mt. Vernon	Ottowa	9	167	176	9	454	.0198	3'-6"x5'-3"	235	268	346	88	60"	A-39"	79
	Ottowa	Foote	8	176	181	9	491	.0183	3'-6"x5'-3"	225	204	278	81	57"	A-30"	95
	Foote	South of Maglee	10	181	186	5	690	.0072	3'-6"x5'-3"	140	202	278	50	66"	A-51"	141
	South of Maglee	Whipple		186	235	49	391	.125	3'x4'-6"	390	180	260	150			
	Whipple	270' S.of Whipple	9	235	241.3	6.3	261	.0241	3'x4'-6"	170	180	260	65	51"	A-36"	57
	270' S.of Whipple	Farragut	9	241.3	248	6.7	280	.024	3'x3'-6"	160	180	260	61	51"	A-36"	62
	Farragut	Lawrence	8	248	264	16	483	.033	3'x3'-6"	190	1180	260	73	51"	A-30"	94
Lawrence	Cayuga	South of Freeway	10	264	268	4	231	.0173	2'-6"x3'-9"	94	152	223	42	51"	A-42"	43
Lawrence	South of Freeway	San Jose & Sadowa		268	285	18	285	.063	48"	370	152	223	165			
Sadowa	San Jose	Plymouth	10	285	287	2	450	.0044	2'-6"x3'-9"	48	97	147	33	57"	A-48"	91
	Plymouth	Capitol	7	287	291	4	825	.0048	2'-4"x3'-6"	42	53	89	47	48"	A-18"	104
Onondaga	Cayuga	Otsego	8	139	147	8	540	.0148	2'-6"x3'-9"	88	53	75	117			
	Otsego	Delano	8	147	165	18	507	.0355	2'x3'	74	43	65	114			
	Delano	San Jose	10	165	178	13	488	.0266	2'x3'	64	36	58	110			
Onondaga	Cayuga	Alemany		139	150	11	350	.031	60"	460	4	8	5800			
San Jose	Sadowa & San Jose	Sagamore	7	285	287	2	396	.0051	2'-4"x3'-6"	42	39.2	58	73	39"	A-24"	70
	Sagamore	R/W	8	287	288	1	200	.005	2'x3'	28	32.3	49.6	56	39"	A-27"	37
	R/W	Alemany		288	298	10	350	.0286	2'x3'	66	30.2	49	135			
District 446																
Alemany	Geneva	Niagara		186.8	192.5	5.7	470	.0121	78"	600	474	611	98		OK	
	Niagara	Mt. Vernon		192.5	196.7	4.2	460	.0091	84"	620	470	611	101			
Mt. Vernon	Alemany	Mission	10	196.7	220	23.3	856	.0272	3'x4'-6"	180	411	547	33	66"	A-57"	172
Mission	Mt. Vernon	Concord	10	220	236	16	300	.053	2'-6"x3'-9"	165	391	525	31	57"	A-51"	61
	Concord	Florentine	11	236	241	5	255	.0196	2'-6"x3'-9"	100	255	515	19	69"	A-63"	62

PLATE 42

OUTFALL NO. 44

DISTRICT NO. 446

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
	Florentine	Guttenberg	10	241	250	9	320	.028	2'-6"x3'-9"	120	376	514	23	66	A-57"	71
	Guttenberg	Lowell	9	250	279	29	710	.041	2'-6"x3'-9"	145	291	405	36	54	A-48"	140
	Lowell	Whittier	10	279	293	14	690	.0203	2'-6"x3'-9"	102	253	361	28	60	A-54"	143
	Whittier	Oliver	10	293	303	10	685	.0146	2'-6"x3'-9"	88	213	316	28	60	A-54"	142
	Oliver	Acton	10	303	310	7	683	.0102	2'-6"x3'-9"	72	176	274	26	63	A-54"	141
	Acton	Co. Line	9	310	320	10	600	.0166	2'x3'	50	145	236	21	54	A-48"	118
Guttenberg	Mission	Morse	8	250	280	30	400	.075	2'x3'	115	97	136	84	33	A-18"	52
		Florentine	8	280	295	15	395	.038	2'x3'	78	71.7	105	74	33	A-21"	52
		Brunswick		205	310	15	146	.103	2'x3'	127	71.7	105	120			
		Pretor	8	310	325	15	275	.054	2'x3'	94	71.7	105	90	33	A-18"	35
District 447																
Geneva	Alemany	Mission		186.8	194.1	7.3	625	.0117	66"	370	291	340	109			
	Mission	London		194.1	196.4	2.3	270	.0085	66"	320	247	309	103			
	London	Paris		196.4	200.3	3.9	285	.0137	60"	310	247	309	100			
	Paris	Lisbon		200.3	203.8	3.5	255	.0137	60"	310	247	309	100			
	Lisbon	Madrid		203.8	210.4	6.6	270	.0244	60"	415	247	309	134			
	Madrid	Edinburgh		210.4	217.0	6.6	270	.0244	54"	310	247	309	100			
	Edinburgh	Naples		217	223.6	6.6	270	.0244	54"	310	247	309	100			
	Naples	Vienna		223.6	231.8	8.2	270	.0304	48"	260	221	250	104			
	Vienna	Athens		231.8	240.5	8.7	270	.0322	48"	265	221	250	106			
	Athens	Moscow		240.5	245.8	5.3	270	.0196	45"	170	148.2	170	100			
	Moscow	Munich		245.8	253.3	7.5	260	.0288	42"	174	148.2	170	102			
	Munich	Prague		253.3	259.1	5.8	293	.0198	45"	172	146.8	170	101			
	Prague	Winding Way		259.1	274.2	15.1	345	.0438	42"	215	145	170	126			
	Winding Way	Chicago		274.2	286.9	12.7	276	.0461	39"	180	138	162	111			
	Chicago	Baltimore		286.9	303.3	16.4	265	.0618	36"	170	118	162	105			
	Baltimore	MH North of Toyon		303.3	308.1	4.8	130	.0369	36"	130	110	128	101			
	MH North of Toyon	MH So. of Toyon		308.1	320.7	12.6	215	.0586	33"	130	110	128	101			
	MH So. of Toyon	Canyon Drive		320.7	332.4	11.7	200	.0585	33"	130	108	128	101			
Athens	Geneva	Rolph	7	240.5	252	11.5	250	.046	2'-6"x3'-9"	156	64	92	169			
	Rolph	Cordova	7	252	266	14	300	.0465	2'x3'	85	54.7	76	112			
Cordova	Athens	Seville		266	279	13	280	.0465	2'x3'	85	50.1	75	113			
	Seville	Munich		279	291	12	270	.044	2'x3'	84	39.2	70.2	119			

OUTFALL NO. 44

DISTRICT NO. 447

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Rolph	Athens	Seville	7	252	262	10	259	.038	2'x3'	78	12	18.7	420			
	Seville	Munich		262	265	3	260	.0115	2'x3'	42	8.8	14.8	280			
	Munich	Prague		265	269	4	259	.0154	2'x3'	49	4.6	8.5	570			
District 448																
Glen Canyon Sewer																
45" Segment	Elk & Paradise	Begin 60" Segment	7	209	225	16	340	.048	45"	270	295	340	79	51"	A-30"	64
60" Segment				225	248	23	592	.0406	60"	540	243	282	192			
48" Segment				248	251	3	55	.055	48"	340	243	280	122			
45" Segment				251	304	53	1,435	.037	45"	240	177	241	99		OK	
42" Segment				304	310	6	168	.035	42"	190	163	185	103			
39"				310	319.7	9.7	225	.043	39"	180	155	143	126			
O'Shaughnessy Sewer	Junction with Paradise Sewer	Taper (Transition Structure)		224	394	70	1,800	.039	3'x4'-6"	220	52	60	365			
	Taper (Transition Structure)	West of Del Vale		394	525	131	3,220	.041	2'-6"x3'-9"	140	35	41	340			

PLATE 44

OUTFALL NO. 45 & 46

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
OUTFALL No. 45 Rankin	Outfall	Custer		-2.1	-1.8	.252	280	.009	60"	80	66	80	100			
	Custer	Davidson		-1.8	-1.6	.22	245	.009	60"	80	66	80	100			
OUTFALL No. 46 Third	Outfall	Diversion Strt.	9	-288	-1.88	1	145	.0069	54"	170	72	101	168	45		
	Diversion Struct.	Arthur	9	-1.7	-1.5	.2	144	.0015	2'-6"x3'-9"	26	72	101	26	60	A-54"	52
	Arthur	Burke	10	-1.5	-.9	.6	397	.0015	"	26	60	90	29	60	A-51"	143
	Burke	Junction Phelps & Custer	10	-.9	-.45	.45	295	.0015	"	26	32	84	31	57	A-51	108
	Junction Phelps & Custer	Davidson	7	-.45	-.00	.45	298	.0015	"	26	22	39	67	42	A-30	80
	Davidson	Evans	7	-.00	2.0	2	298	.00715	2'x3'	31	16	31	100			
	Evans	Fairfax		2.00	3.0	3	298	.00336	"	22	11	21	100			

PLATE 45

OUTFALLS NO. 48 & 49

DISTRICT NO.

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
OUTFALL NO. 48																
Evans	Outfall	Keith		0.81	3.53	2.72	1755	.00154	72"	170	278	167	102			
	Keith	Lane		3.53	5.03	1.5	664	.00225	"	220	210	167	132			
Lane	Evans	Fairfax		5.03	5.66	.63	280	"	"	220	209	167	132			
Fairfax	Lane	Mendell		5.66	7.17	1.51	664	"	"	220	193	167	132			
Mendell	Fairfax	Galvez		7.17	7.60	.43	280	.0015	"	165	189	167	99			
Galvez	Mendell	Newhall		7.60	8.62	1.02	664	.0015	"	167	182	167	100			
Newhall	Galvez	Hudson		8.62	9.07	.45	280	.0016	"	167	179	167	100			
	Hudson	Innes	9	9.07	9.285	.215	"	.00076	"	118	166	160	73.5	78"	A-51"	56.4
	Innes	Jerrold	9	9.285	9.5	.215	"	.00076	"	118	162	160	74	78"	A-51"	56.4
Jerrold	Newhall	Phelps		9.5	10.39	.89	664	.00134	4'x6'	86	64	69	124			
Phelps	Jerrold	Kirkwood		10.39	10.63	.24	280	.00086	"	70	59	68	102			
	Kirkwood	La Salle		10.63	10.85	.22	"	.00078	"	66	55	66	100			
	La Salle	McKinnon		10.85	11.06	.21	"	.00075	"	64	51	64	100			
	McKinnon	Newcomb		11.06	11.385	.325	"	.0012	"	82	47	61	134			
Newcomb	Phelps	Quint		11.385	12.185	.8	664	.0012	"	82	40	60	136			
Quint	Newcomb	Oakdale		12.185	12.51	.325	280	.0012	"	82	38	61	134			
Oakdale	Quint	Rankin		12.51	13.35	.84	664	.0012	"	82	21	39	210			
OUTFALL NO. 49																
Hudson	Hawes	Hunter's Point E. P.L.		11.64	16.34	4.7	120	.0393	2'x3'	79.5	42	81	98			

PLATE 46

OUTFALL NO. 51

DISTRICT NO. 510

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Griffith	Outfall	Wallace		*-2.50	-1.86	.64	140	.0045	66"	240	235	232	102			
	Wallace	Van Dyke		*-1.86	-0.66	1.20	280	.0043	"	230	226.8	226	102			
	Van Dyke	Underwood		*-0.66	+0.46	1.12	280	.004	"	225	214	214	105			
	Underwood	Thomas	8	* 0.46	1.21	.75	280	.0027	"	180	201	200	90	69"	A-30"	73.3
	Thomas	Shafter		* 1.21	2.30	1.09	280	.0039	"	210	192.5	194	108			
Griffith	Oakdale	Palou		5.0	4.54	.46	200	.00232	48"	72	44.4	66	109			
	Palou	Quesada		4.54	3.895	.645	280	"	4'x6'	112	69.9	104	108			
	Quesada	Revere		3.895	3.250	.645	280	"	"	112	78.5	114	99			
	Revere	Shafter	8	3.250	2.30	.95	280	.0034	"	140	87.1	124	113			
	Shafter	Junction Structure	9	2.30	2.52	.22	30	.073	48"	400	92.3	129	310			
Shafter	Griffith	Hawes	8	2.30	3.30	1	664	.00152	4'x6'	92	100.2	114	80	63"	A-33"	183.2
Hawes	Shafter	Thomas	8	3.30	3.725	.425	280	"	"	92	83.1	106	86	60"	A-27	52.2
Thomas	Hawes	Ingalls	8	3.725	4.725	1	664	"	"	92	79.1	108	84	63"	A 30"	128.3
	Ingalls	Jennings		4.725	5.725	1	664	"	"	92	62	96	95			
Jennings	Thomas	Underwood		5.725	6.150	.425	280	"	3'-6"x5'-3"	65	39	67	98			
Underwood	Jennings	Keith		6.150	7.150	1	664	"	"	65	35	68	96			
Keith	Underwood	Van Dyke		7.150	7.575	.425	280	"	"	65	8	25	260			
	Van Dyke	Wallace		7.575	8.165	.59	280	.0021	2'-4"x3'-6"	27	4	19	142			
Wallace	Keith	Lane		8.165	9.56	1.395	664	"	"	27		12	224		sanitary	
Lane	Wallace	Yosemite		9.56	10.15	.59	280	"	"	27		12	224		"	

PLATE 47

OUTFALL NO. 52

DISTRICT NO. 521, 522, 523

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
DISTRICT 521																
Yosemite	Outfall	Ingalls	-	-1.65	-1.05	.6	200	.003	11'-6"x6'-6" & 9'x9'-3"	1260	1047	915	138			
	Ingalls	Jennings	12	-1.05	+1.60	2.65	664	.004	84"	410	810	740	55	105"	A-78"	375
	Jennings	Keith	12	1.60	4.25	2.65	664	.004	84"	410	783	740	55	105"	A-78"	375
	Keith	Lane & Third	11	4.25	10.15	5.9	590	.01	66"	340	778	740	46	90"	A-72"	305
DISTRICT NO. 522																
Ingalls	Yosemite	Armstrong	9	-1.65	.97	2.62	280	.0094	60"	260	237	332	77	66"	A-39"	82
	Armstrong	Bancroft	8	.97	3.59	2.62	280	"	"	260	223	323	81	66"	A-36"	80
	Bancroft	Carroll		3.59	6.21	2.62	280	"	4'x6'	250	205	243	102			
	Carroll	Donner		6.21	8.83	2.62	280	"	"	250	194	235	106			
	Donner	Egbert		8.83	11.45	2.62	280	"	"	250	183	226	111			
	Egbert	Fitzgerald		11.45	14	2.55	280	.0092	2'-6"x3'-9"	70	45	57	123			
	Fitzgerald	Gilman		14	22	8	280	.0285	2'x3'	68	38	48	142			
	Gilman	Hollister		22	45	23	280	.082	"	115	36	45	258			
	Hollister	Ingerson		45	66	21	280	.075	"	110	32	39	280			
Ingerson	Ingalls	Redondo		66	110	44	332	.133	"	145	23	29	500			
Bancroft	Ingalls	Jennings	8	3.59	5.39	1.8	664	.00272	2'-6"x3'-9"	38	56	69	55	48"	A-36"	189
	Jennings	Keith	8	5.39	7.19	1.8	664	.00272	2'x3'	22	43	58	38	45"	A-36"	189
	Keith	3rd	8	7.19	9	1.8	664	.00272	"	22	37	54	41	42"	A-36"	189
Egbert	Ingalls	Jennings	8	11.45	15.60	4.15	664	.00625	3'-6"x5'-3"	130	128	176	74	57"	A-36"	189
Jennings	Egbert	Fitzgerald	9	15.60	17.36	1.76	280	.00625	3'x4'-6"	88	123	173	51	57"	A-45"	89
	Fitzgerald	Gilman	9	17.36	19.12	1.76	280	.00625	"	88	115	166	53	54"	A-42"	86.5
Gilman	Jennings	Keith & Third	9	19.12	23.5	4.38	700	.00625	2'-6"x3'-9"	54	71.5	115	47	48"	A-39"	205
Third	Gilman	Hollister	8	23.5	25	1.5	250	.006	2'x3'	29	48.5	79	37	42"	A-36"	74.5
	Hollister	Salinas Ave.	7	25	33.7	8.7	385	.023	"	56	44	73	77	33"	A-18"	89
Salinas	Third	Keith		33.7	38.28	4.58	131	.035	"	70	28	48	146			
Keith	Salinas	Jamestown		38.28	4.5	6.72	193	.035	"	70	27.5	47.5	148			
DISTRICT 523																
Yosemite	Third & Lane	Mendell	9	10.15	15.20	5.05	720	.007	87"	660	772	740	89	96"	A-42"	132
Mendell	Yosemite	Armstrong	9	15.20	15.89	.69	100	.0069	"	660	748	"	89	96"	A-42"	18.2
Easement	Armstrong	Shoup	11	15.89	19.89	4	400	.01	69"	390	723	"	54	87"	A-66"	101
Donner (extended)	Mendell & Shoup	Newhall	11	19.89	31.09	11.2	1120	.01	"	390	701	"	55	87"	A-66"	284
	Newhall	Phelps	11	31.09	39.29	8.2	820	.01	"	390	657	"	60	87"	A-66"	207
Phelps	Donner	Bayshore	11	39.29	44.89	5.6	560	.01	69"	390	571	628	62	84"	A-57"	126.5
Bayshore	Phelps	Wayland	11	44.89	47.64	2.75	275	.01	69"	390	570	628	62	84"	A-57"	62
Wayland	Bayshore & Fitzgerald	San Bruno	11	47.64	49.64	2	285	.007	69"	340	563	628	54	90"	A-66"	72

OUTFALL NO. 52

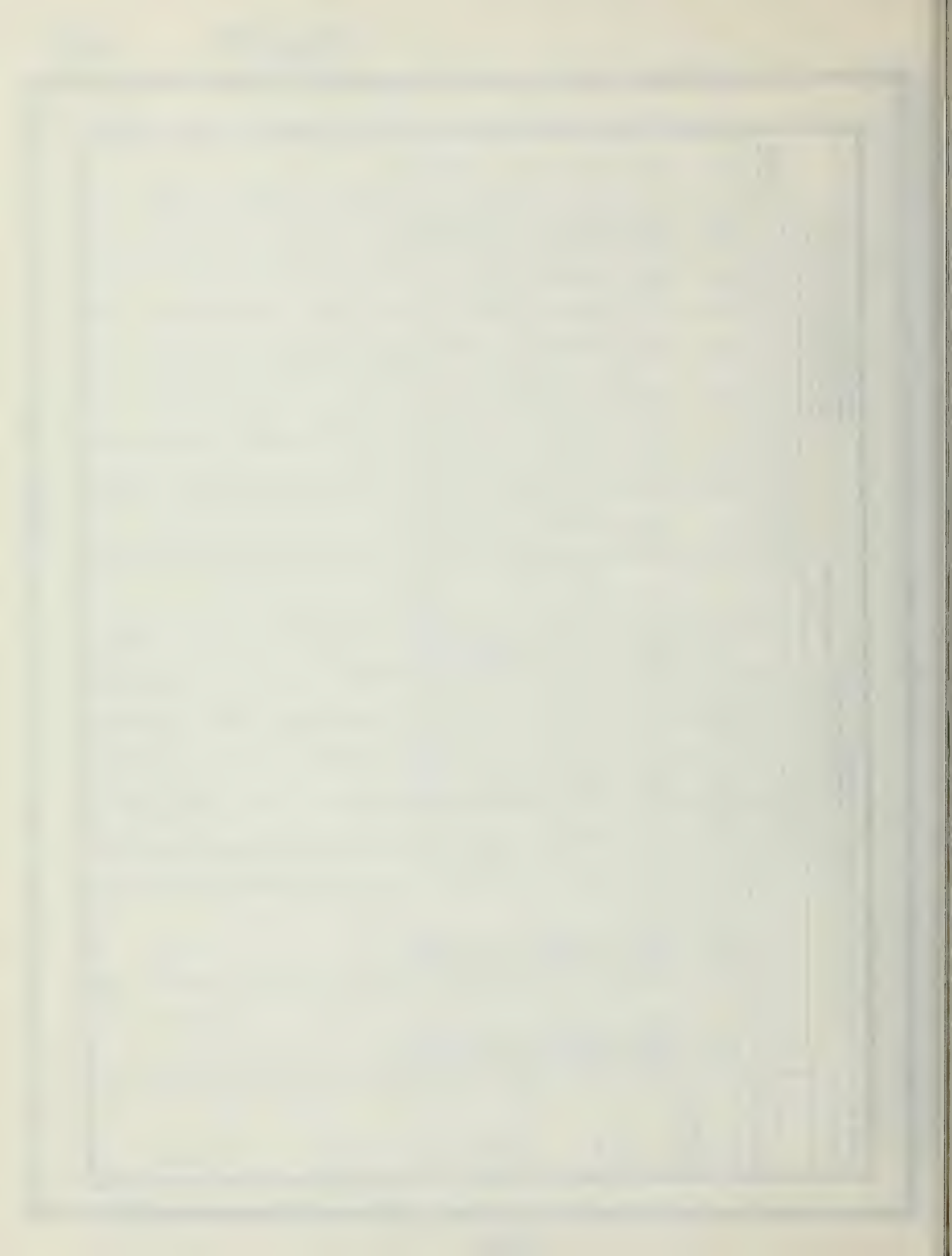
DISTRICT NO. 524

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Phelps	Donner	Carroll	9	39.29	39.905	.615	200	.0022	2'x3'	17	67	108	16	57"	A-54"	102
	Carroll	Bancroft	9	39.905	40.520	.615	280	.0022	"	17	62	102	17	57"	A-54"	102
	Bancroft	Vesta & Williams	9	40.520	41	.480	220	.0022	"	17	44	74	23	51"	A-45"	70
DISTRICT 524																
Wayland	San Bruno	Girard	10	49.64	53.14	3.5	303	.0116	3'-6"x5'-3"	180	319	470	38	72"	A-60"	69.5
	Girard	Brussels	9	53.14	58.34	5.2	300	.0174	"	230	300	450	51	63"	A-51"	60.3
	Brussels	Goettingen	9	58.34	66.04	7.7	300	.0255	"	265	280	425	62	60"	A-42"	55
	Goettingen	Somerset	9	66.04	74.74	8.7	300	.029	"	190	256	396	48	57"	A-45"	58
Somerset	Wayland	Woolsey	9	74.74	80.44	5.7	460	.0123	3'x4'-6"	75	239	193	39	51"	A-42"	84
Woolsey	Somerset	Holyoke	9	80.44	84.11	3.67	300	.0122	2'-6"x3'-9"	74	236	192	39	51"	A-42"	55
	Holyoke	Hamilton	9	84.11	87.97	3.86	300	.0162	"	85	231	187	45	48"	A-39"	52
	Hamilton	Bowdoin	8	87.97	100.37	12.40	300	.0415	2'x3'	76	218	171	45	39"	A-33"	62
	Bowdoin	Dartmouth	8	100.37	109.97	9.60	300	.032	"	56	204	150	37	39"	A-33"	62
	Dartmouth	Colby	8	109.97	121.67	11.70	300	.039	"	73	188	128	57	36"	A-27"	62
	Colby	University	7	121.67	136.47	14.80	300	.049	"	82	181	119	69	33"	A-24"	53
Somerset	Wayland	Bacon	8	74.74	86.5	11.76	460	.0255	2'-6"x3'-9"	105	123	168	64	45"	A-33"	95
	Bacon	Burrows	9	86.50	88.50	2	460	.00435	"	44	119	168	26	60"	A-54"	93
	Burrows	Felton	9	88.50	90.5	2	460	.00435	"	44	113	167	26	60"	A-54"	93
Felton	Somerset	Holyoke	9	90.5	97	6.5	300	.0216	2'x3'	54	108	164	32	45"	A-39"	52
	Holyoke	Hamilton	8	97	107	10	300	.033	"	68	105	161	42	42"	A-36"	63.2
	Hamilton	Bowdoin	8	107	115	8	300	.0265	"	62	99	154	40	42"	A-36"	63.2
San Bruno	Wayland	Woolsey	8	49.64	53.82	4.18	460	.0091	3'x4'-6"	105	104	145	72	48"	A-30"	89
	Woolsey	Dwight	9	53.82	58	4.18	460	.0091	2'-4"x3'-6"	54	101	143	38	48"	A-42"	84
	Dwight	Olmstead	7	58	85.85	27.85	460	.06	2'x3'	90	83	120	75	33"	A-21"	60
	Olmstead	Mansell		85.87	113.7	27.83	460	.06	2'x3'	90	43	65	138			

PLATE 49



OUTFALL NO. 53

DISTRICT NO. 530

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS		FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
				LOWER	UPPER											
Fitch	Bancroft (outfall	Carroll		-1.23	-1.025	.205	320	.00064	81"	150	128	150	100			
	Carroll	Donner		-1.025	- .846	.179	280	"	81"	150	106	150	100			
	Donner	Egbert		-0.846	-0.667	.179	280	"	81"	150	101	150	100			
	Egbert	Fitzgerald		-0.667	-0.49	.177	280	"	81"	150	85	150	100			
	Fitzgerald	Gilman		-.049	-0.29	.20	240	.00082	66"	98	48	98	100			
Gilman	Fitch	400 ft. East	8	-0.29	-0.12	0.17	400	.00042	66"	70	41	80	87	69"	A-33"	110
	400 ft. East	910 ft. East	8	-0.12	+0.15	.27	510	.00053	48"	33	17	40	85	54"	A-27"	130
	910 ft. East	1310 ft. East	8	0.15	0.36	.21	400	.0053	2'-6"x3'-9"	15	15	20	75	39"	A-24"	100
Fitzgerald	Fitch	Griffith		-0.49	3.47	3.96	540	.00735	54"	180	30	93	194			

OUTFALL NO. 54

DISTRICT NO. 540

** A-24" : Construct 24" auxiliary size.
R : Replace with required size.
d : Average depth of trench over indicated length.

* Street Slope = 0
Noted slope calculated on basis of HGL at Outfall = -3.5
Constant gradient to control elevation at upstream end of sewers so designated.

STREET	FROM	TO	** d (ft.)	E.G.L. ELEVATIONS LOWER	E.G.L. ELEVATIONS UPPER	FALL (ft.)	LENGTH (ft.)	SLOPE	EXISTING SIZE	EXISTING CAPACITY (c.f.s.)	TRIBUTARY AREA (Acres)	CALCULATED RUN-OFF (c.f.s.)	% ADEQUATE	REQUIRED SIZE	** COMMENTS	COST IN THOUSANDS OF DOLLARS
Sunnydale	Outfall	Bayshore	13	* 1.8	7.8	6	3257	.00184	78"	230	685	518	44	108"	A-87"	1964.0
	San Bruno	Desmond	10	7.8	9.6	1.8	370	.0051	66"	250	473	436	58	81"	A-60"	84.6
	Desmond	Talbert	10	9.6	11	1.4	260	.0051	66"	250	468	437	58	81"	A-60"	59.5
	Talbert	Peabody	8	11	16	5	277	.018	3'-6"x5'-3"	225	199	262	86	54"	A-27"	51.5
	Peabody	Rutland		16	23	7	277	.0255	"	260	192	256	102			
	Rutland	Cora		23	30	7	277	"	3'x4'-6"	175	74	88	200			
	Cora	Delta		30	37	7	277	"	"	175	67	81	216			
	Delta	Schwerin		37	45	8	277	.029	"	190	60	73	260			
Bayshore	Sunnydale	Visitacion	8	7.8	18.5	10.7	618	.0174	2'x3'	48	69	106	44	39"	A-33"	134.2
	Visitacion	Leland	7	18.5	26.7	8.2	320	.0255	"	58	46	70	83	33"	A-18"	40.3
	Leland	Raymond		26.7	37.7	11	265	.0415	"	76	40	60	126			
Talbert	Sunnydale	County Line	8	11	18.3	7.3	435	.0168	3'-6"x5'-3"	220	268	251	88	54"	A-27"	80.9
Easement (at County Line)	Talbert	Peabody	8	18.3	23	4.7	280	"	"	220	268	251	88	54"	A-27"	52.1
	Peabody	Rutland	8	23	28.05	5.03	300	"	3'-4'-6"	150	265	251	60	54"	A-39"	51.2
	Rutland	Cora	8	28.05	32.75	4.7	280	"	"	"	262	251	60	54"	A-39"	47.7
	Cora	Delta	8	32.75	37.45	4.7	280	"	"	"	258	250	60	54"	A-39"	47.7
	Delta	Schwerin	8	37.45	44.99	7.55	450	"	"	"	258	251	60	54"	A-39"	76.7
	Schwerin	Rey	8	44.99	49.1	4.2	250	"	3'x4'-6"-33"	234	190	192	122		(Existing)	
	Rey	Britton	8	49.1	53.6	4.55	270	"	"	"	184	186	126		33"	
	Britton	Loehr	8	53.6	57.95	4.35	260	"	"	"	178	184	127		auxiliary)	
	Loehr	Sawyer	8	57.95	64.50	6.55	390	"	"	"	150	156	150		on Velasco)	
	Sawyer	Hahn	8	64.50		4.7	280	.0168	3x4'-6"+33"	"	131	131	133	176	"	
Castillo(Extended	Hahn & Sunrise Way	Velasco		69.20	7.6	6.8	400	"	"	"	93	94	250		"	
Velasco	Castillo	Pasadena		76	84	8	260	.031	3'x4'-6	195	131	155	126			
	Pasadena	Santos		84	96	12	270	.0445	"	230	129	155	148			
Santos	Velasco	Easement (at Santos)		96	110	14	130	.108	"	350	126	153	230			
Easement	Santos	Carrizal	8	110	111.87	1.87	270	.0069	"	108	119	143	76	51"	A-33"	56.0
Carrizal	Easement	Geneva	8	111.87	115	3.13	450	.0069	"	108	117	142	76	51"	A-33"	93.4
Rutland	Sunnydale	Visitacion	7	23	45	22	620	.035	2'-6"x3'-9"	127	118	161	79	39"	A-24"	109.7
	Visitacion	Leland	7	45	62.5	17.5	435	.04	"	135	114	160	84	39"	A-21"	56.6
	Leland	Raymond		62.5	74	11.5	260	.044	"	140	104	146	96	39"		
	Raymond	Arleta	8	74	79.5	5.5	260	.021	2'x3'	54	85	121	45	39"	A-33"	54.0
	Arleta	Teddy	7	79.5	89	9.5	260	.0364	"	72	77	111	65	36"	A-24"	46.2
	Teddy	Campbell		89	113	24	260	.092	"	112	59	87	129			
Schwerin	Easement (3'x4'-6" sewer)	Velasco		44.99	50.45	5.46	260	.021	33"	78	65	78	100			
(Velasco Auxiliary)	Schwerin	Oriente		50.45	55.91	5.46	260	.021	33"	77	63.7	77	100			
	Oriente	Accacia		55.91	61.11	5.20	260	.020	33"	76	61.8	76	100			
	Accacia	Rio Verde		61.11	66.05	4.94	260	.019	33"	74	59.7	74	100			
	Rio Verde	Calgary		66.05	69.95	3.90	260	.015	33"	64	56.3	64	100			
	Calgary	Pueblo		69.95	73.20	3.25	260	.0125	33"	60	51.3	60	100			
	Pueblo	Castillo		73.20	76.0	2.80	260	.0108	33"	55	42	55	100			

PLATE 51

INADEQUATE SEWERS LIST

(Less than 20% Adequate)

1. Army, Alabama to Potrero
2. Cabrillo, 12th Ave. to Funston
3. California, 6th to 8th
4. Church, 25th to Army
5. Drumm, California to Commercial
6. Drumm, Clay to Jackson
7. 18th St., Church to So. Van Ness
8. Fifth St., Folsom to Brannan
9. 44th Ave., Moraga to Kirkham
10. 46th Ave., Quintara to Pacheco
11. 47th Ave., Moraga to Kirkham
12. Jackson, Drumm to Embarcadero
13. Jackson, Montgomery to Sansome
14. Judah, 12th to Funston
15. Main, Mission to Howard
16. Marin, Kansas to Outfall
17. Market, Beale to Drumm
18. Mason, Chestnut to Beach
19. Mission , Lowell to Guttenburg
20. Ocean Ave., Jules to Ashton
21. Powell, Francisco to Beach
22. Rhode Island, Alameda to Division
23. Sacramento, Montgomery to Sansome
24. Santiago, 22nd to 24th

25. Selby, Jerrold to Outfall
26. 17th, Mississippi to Texas
27. Stanyan , Buelah to Waller
28. Steuart, Folsom to Howard
29. Third St., Davidson to Burke
30. Third St., 24th to 25th
31. 23rd Ave., California to Lake

INADEQUATE SEWERS 21% to 50%
1971 - 1977

1. Alemany, San Bruno to Bayshore
2. Army, Folsom to Valencia
3. Athens, Geneva to Amazon
4. Baker, Greenwich to Lombard
5. Bancroft, Keith to Jennings
6. Beach, Powell to Outfall
7. Beach, Webster to Fillmore
8. Cabrillo, 39th to 40th
9. Chestnut, Steiner to Pierce
10. Cole, Gratton to Parnassus
11. Cole, Waller to Page
12. Clay, Montgomery to Sansome
13. 18th, Hartford to Church
14. Eucalyptus, Melba to 26th Ave.
15. Fell, Baker to Scott
16. Fell, Central to Lyon
17. Fell, Van Ness to Market
18. Fillmore, Beach to Marina
19. Folsom, Spear to Steuart
20. 41st, Moraga to Lawton

21. 46th, Cabrillo to Fulton
22. 43rd, Cabrillo to Fulton
23. 43rd, Irving to Lincoln Way
24. 43rd, Kirkham to Judah
25. Francisco, Scott to Pierce
26. Franklin, Union to Greenwich
27. Front, Washington to Jackson

28. Harrison, 18th to 19th
29. Howard, Spear to Outfall

30. Industrial, Bayshore to Oakdale
31. Jackson, Columbus to Montgomery

32. Kirkham, 25th to 28th
33. Kirkham, 23rd to 24th

34. Laguna Honda, Ventura to Noreiga
35. Lake, 14th to 15th
36. Lake, 9th to 10th
37. Lake, 16th to 17th

38. Marina, Fillmore to Pierce
39. Mason, Columbus to Chestnut
40. Mendell, Shoup to Yosemite
41. Mission, Acton to Lowell
42. Mission, Guttenburg to Mt. Vernon
43. Mt. Vernon, Mission to Alemany

44. Newhall, Hudson to Galvez

69. Talbert, Co. Line to Sunnydale
70. Taraval, 21st to 22nd
71. Third, Hollister to Gilman
72. 30th, Lawton to Kirkham
73. 20th Ave., Moraga to Lawton
74. 25th St., Sanchez to Church
75. 24th Ave., Anza to Geary
76. 24th At., Diamond to Castro
77. 24th St., Hoffman to Homestead
78. 22nd St., Inniana to Minnesota
79. 26th Ave., Lawton to Kirkham
80. 23rd Ave., Lawton to Kirkham
81. Turk St., Jones to Taylor
82. Turk St., Larkin to Hyde
83. Ulloa, Claremont to Wawona
84. Underwood, Keith to Jennings
85. Valencia, Tiffany to Army
86. Vicente, 26th to 28th Ave.
87. Waller, Pierce to Fillmore

45. Ocean, Plymouth to Jules
46. Ocean, Lee to Brighton
47. Pierce, Lombard to Francisco
48. Powell, Columbus to Francisco
49. Quint, Davidson to Custer
50. Rolph, Winding to Seville
51. Sadowa[illegible], Capital to San Jose
52. Sanchez, Jersey to 25th
53. San Jose, Sickles to Lawrence
54. Santa Rosa, San Gabriel to Cayuga
55. Santiago, 20th to 22nd
56. Scott, Fell to Oak
57. Scott, Page to Waller
58. Selby, Oakdale to Jerrold
59. Seventh, Irving to Lincoln Way
60. Seventh, Noreiga to Judah
61. Sloat, 24th to 25th
62. Somerset, Woolsey to Waylan
63. South Van Ness, 22nd to 20th
64. Stanyan, Frederick to Beulah
65. Steiner, Geary to O'Farrell
66. Steiner, Greenwich to Lombard
67. Sunnydale, Desmond to Bayshore
68. Sutter, Pierce to Steiner

INADEQUATE SEWER LIST
(50% to 75% Adequate)

1. Mission, Main to 2nd
2. Montgomery, Pineto California
3. Taylor, Bay to North Point
4. Mason, Green to Columbus
5. Beach, Taylor to Grant
6. Fillmore, Lombard to Francisco
7. Laguna, Lombard to Chestnut;
   Chestnut to Francisco
8. Cole, Alma to Grattan;
   Parnassius to Carl;
   Beulah to Waller
   Page to Fell
9. Fell, Cole to Ashburh
   Gough to Market
10. 17th St., Missouri to Carolina
    Folsom to Treat
11. Rhode Island, 15th to Alameda
12. 22nd St., Mississippi to 3rd
13. Third St., 19th to 20th
14. Alabama, 20th to 19th
15. 18th St., Diamond to Collingwood
16. Baker, Union to Marina Blvd.
17. Broderick, Lombard to Chestnut
18. Steiner, Filbert to Greenwich
19. Vallejo, Van Ness to Franklin
20. Turk, Hyde to Leavenworth;
    Leavenworth to Jones
21. 7th St., Folsom to Harrison
22. Turk, Steiner to Fillmore;
    Fillmore to Webster

23. Golden Gate, Tamalpais to Masonic
Buchanan to Laguna

24. Laguna , McAllister to Grove

25. Octavia, Grove to Fell

25. 10th St., Folsom to Bryant

26. Pierce, Pin e to Sutter

27. Sutter, Pierce to Steiner

28. Post, Divisadero to Steiner

29. 31st Ave., Clement to California

30, Fulton, 33rd to 34th;
35th to 37th;
40th to 41st

31. Great Highway to La Playa

32. 40th Ave., Cabrillo to Fulton

33. Scott, Fell to Oak

34. Duboce, Fillmore to Church

35. 15th St., Van Ness to Folsom

36. Church, 15th to 16th

37. Stanyan, Parnassus to Frederick

38. Webster, Eddy to Turk

39. Arguello, Anza to Geary

40. 8th Ave., Anza to Geary;
California to Lake

41. Lake, 15th to 16th;
7th to 8th

42. Geary, Parker to Jordan

43. 14th Ave., California to Lake

44. 17th Ave., Geary to Clement;
California to Lake

45. 23rd Ave., Cabrillo to Geary

PLATE 60

46. 7th Ave., Judah to Irving

47. Judah, 9th to 10th;
Fulton to 14th

48. 12th Ave., Kirkham to Judah

49. 14th Ave., Judah to Irving

50. Noriega, 24th to 28th

51. Kirkham, 24th to 25th;
28th to 30th

52. 29th Ave., Ortega to Moraga

53. Vicente, 43rd to Outfall

54. Quintara, 40th to 41st;
45th to 46th

55. Pacheco, 45th to 46th

56. Taraval, 20th to 21st

57. 22nd Ave., Ulloa to Vicente

58. Bicente, 22nd to 27th;
33rd to 34th

59. Sloat, Springfield to 34th

60. Taraval, 19th to 20th

61. Kensington, Portola to Ulloa

62. Wawona, 14th to 15th

63. Junipero St., Monterey to Darian
Darian to Eucalyptus

64. Ocean, Harold to Lee;
Brighton to Plymouth

65. Hearst, Forster to Edna

66. Flood, Edna to Detroit

67. Santa Rosa, Congo to San Jose

68, Foerster, Flood to Monterey

69. 29th St., Dolores to San Jose

70. Tiffany, 29th to Valencia

71. Mission, Virginia to 29th

72. Oakdale, Loomis to Barneveld

73. Alemany, Westview to Tulagi;
Tulagi to San Bruno

74. Army, Mission to Folsom;

75. Mission, Amazon to Seneca;
Italy to France;
France to Onondaza
Regent to Acton

76, Rolph, Seville to Athens

77. Onandaga, Mission to Alemany

78. Woolsey, Hamilton to Holyoke

79. Felton, Holyoke to Somerset

80. Somerset, Felton to Wayland

81. San Bruno, Olmstead to Wayland

82. Bay Shore, Wayland to Phelps

83. Phelps, Bayshore to Egbert

84. Donner, Phelps to Newhall

85. Rutland, Teddy to Raymond

INADEQUATE SEWERS LIST

(Above 75% Adequate)

1. Pacheco, 36th Ave. to 37th Ave.
2. Moraga, 40th Ave., to 41st Ave.
3. Cornwall, 6th Ave. to 8th Ave.
4. Lake, 10th Ave. to 13th Ave.;
   20th Ave. to 22nd Ave.
5. Geary, Cooke to Spruce;
   Jordan to Palm
   25th to 24th
6. Euclid, Palm to Arguello
7. Funston, Cabrillo to Balboa;
   Anza to Geary
8. Cabrillo, 24th Ave. to 23rd Ave.
9. Fulton, 31st Ave. to 33rd Ave.;
   37th Ave. to 40th Ave.
10. 14th St., Mission to Harrison
11. Dolores, 14th St. to 15th St.
12. 15th St., Folsom to Harrison
13. 17th St., Mission to Van Ness
14. Sanchez, Duboce to 14th St.
15. Church, 14th St. to 15th St.;
    16th St. to 17th St.
16. Oak, Stanyan to Shrader
17. Cole, Frederick to Beulah
18. Fell, Ashbury to Central;
    Lyon to Baker
19. San Bruno, 16th St. to 15th St.
20. Carolina, Mariposa, to 17th
21. Mariposa, 3rd to Illinois

22. 18th St., Eureka to Diamond;
Guerrero to Valencia

23. 10th St., Irving to Lincoln

24. 19th Ave., Pacheco to Ortega

25. 20th Ave., Noriega to Moraga;
Lawton to Irving

26. Laguna Honda, Vasquez to Merced;
Dewey to Plaza

27. Howard, Fremont to Main

28. Lombard, Buchanan to Webster

29. Francisco, Fillmore to Pierce

30. Franklin, Green to Union

31. Francisco, Broderick to Baker

32. Laguna, North Point to Beach

33. Pierce, Bay to North Point

34. Scott, Chestnut to Francisco

35. 7th St., Market to Mission;
Howard to Folsom

36. Steiner, Sutter to Post;
Ellis to Eddy

37. Webster, Turk to Golden Gate;
Post to Geary

38. Golden Gate, Webster to Buchanan

39. Fell, Octavia to Gough

40. 10th St., Market to Mission;
Folsom to Harrison

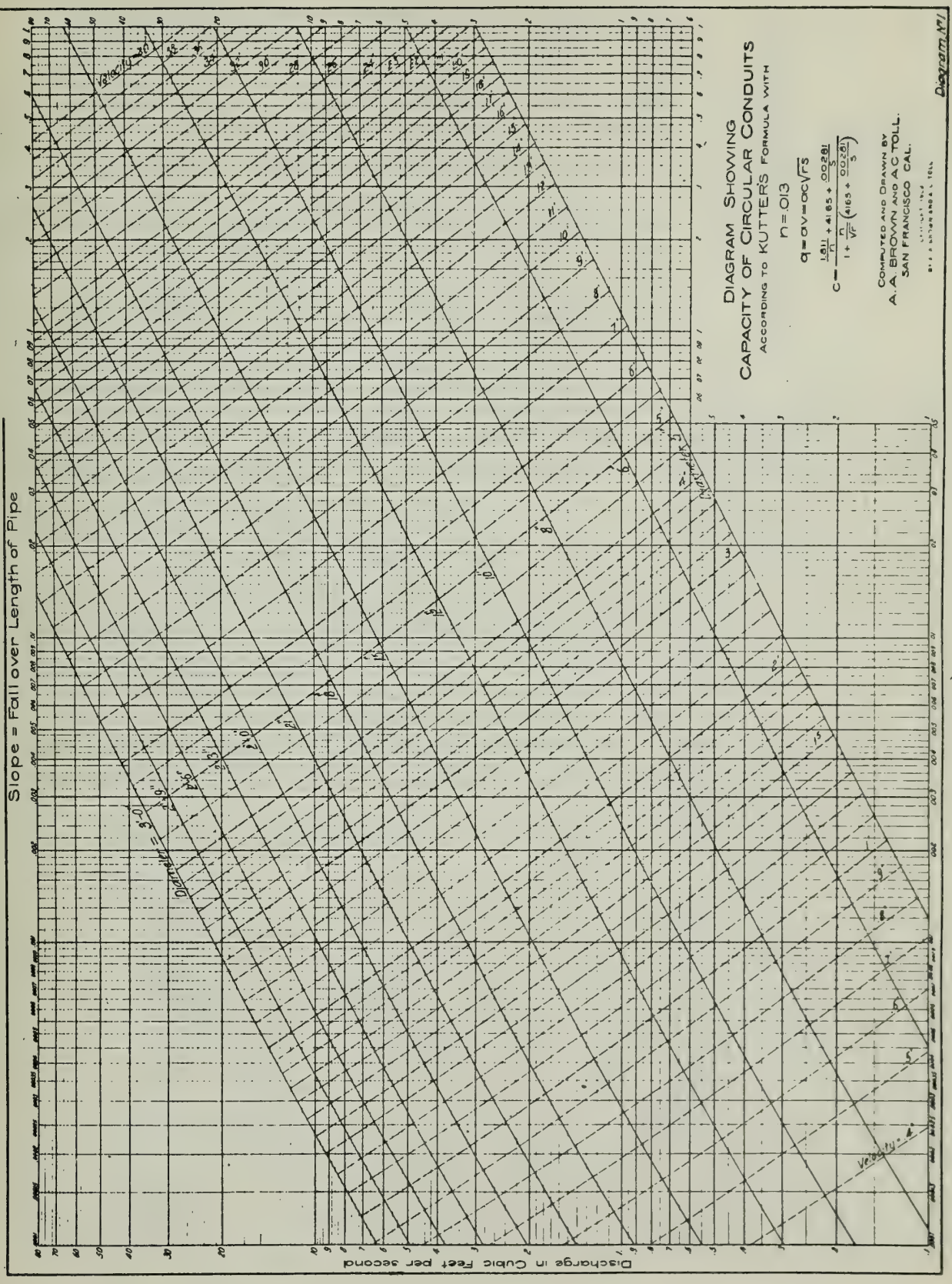
41. California, Divisadero to Pierce

42. Sutter, Broderick to Divisadero

43. Divisadero, Sutter to Post

44. Fillmore, Bush to Sutter

45. Page, Octavia to Gough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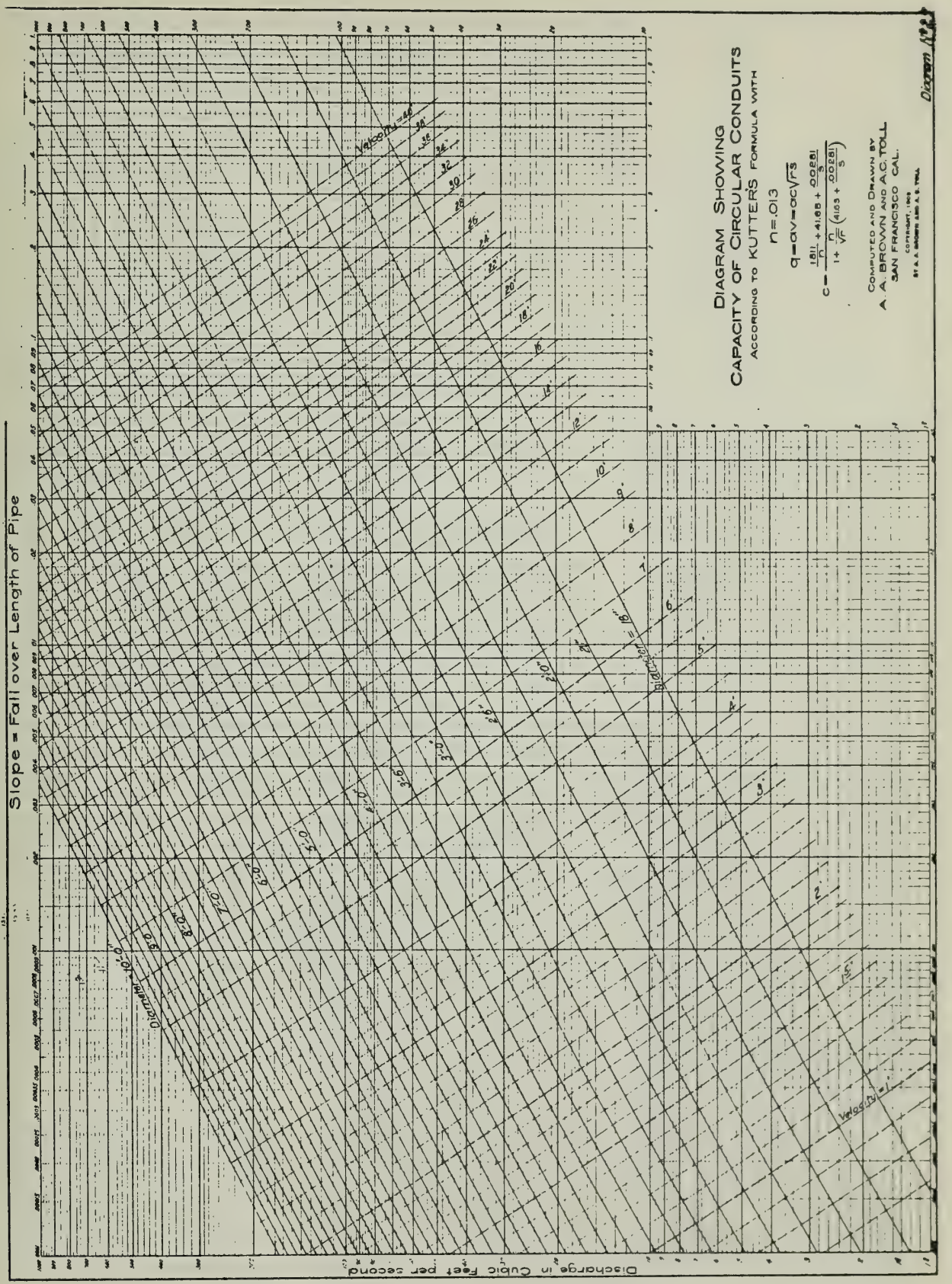
COMPUTED AND DRAWN BY
A. A. BROWN AND A. C. TOLL.
SAN FRANCISCO CAL.
Diagram N°1
Slope = Fall over Length of Pipe
Discharge in Cubic Feet per second
Velocity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ACCORDING TO KUTTER'S FORMULA WITH
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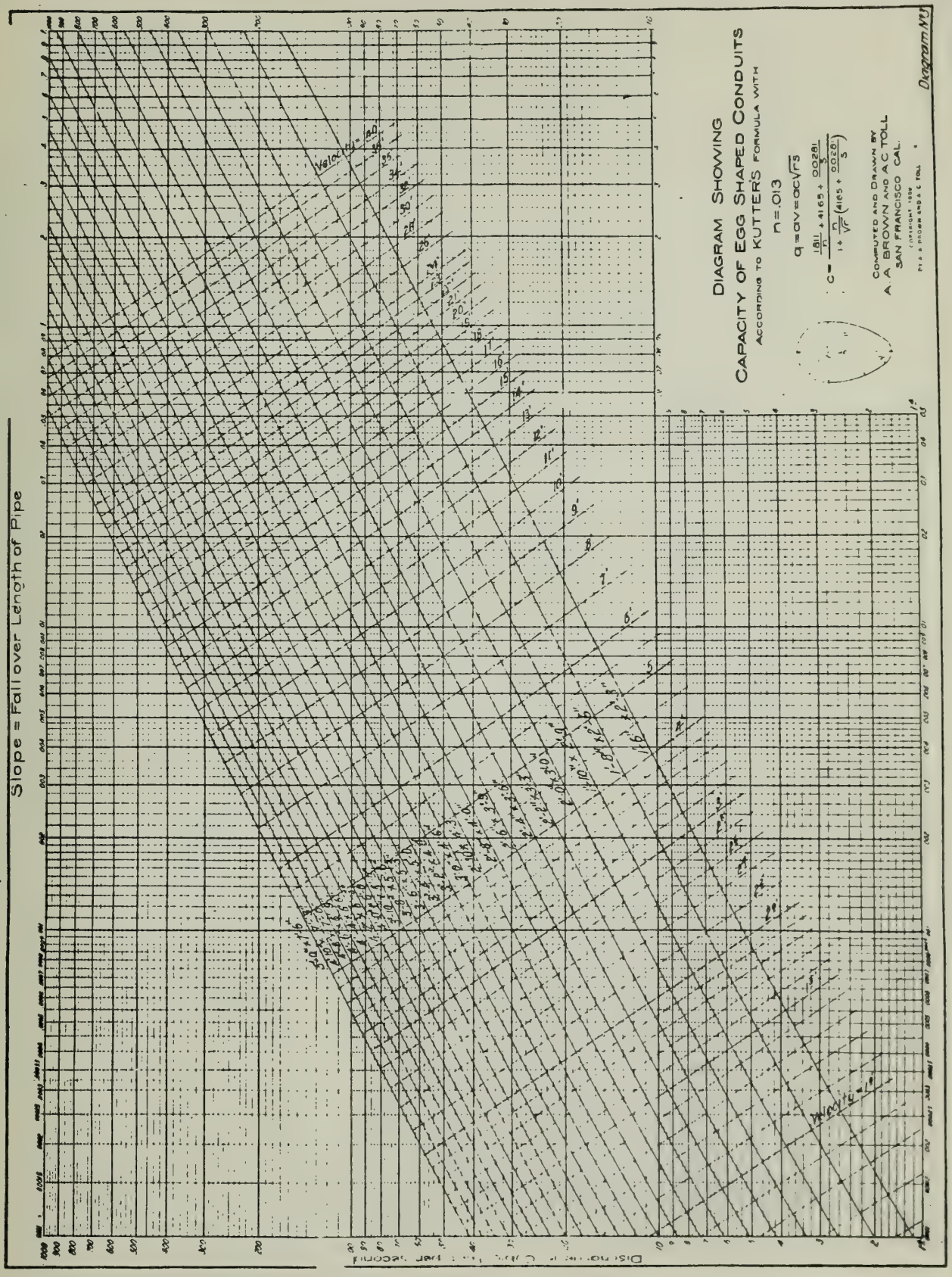
COMPUTED AND DRAWN BY
A. A. BROWN AND A.C. TOLL
SAN FRANCISCO CAL.
Slope = Fall over Length of Pipe
Discharge in Cubic Feet per second
Velocity


Slope = Fall over Length of Pipe
DIAGRAM SHOWING
CAPACITY OF EGG SHAPED CONDUITS
ACCORDING TO KUTTER'S FORMULA WITH
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q=av=cr√rs
c = 181 + 41.65 + 0.0281/s / 1 + n/√r (41.65 + 0.0281/s)
COMPUTED AND DRAWN BY
A. BROWN AND A.C. TOLL
SAN FRANCISCO CAL.
Diagram No.

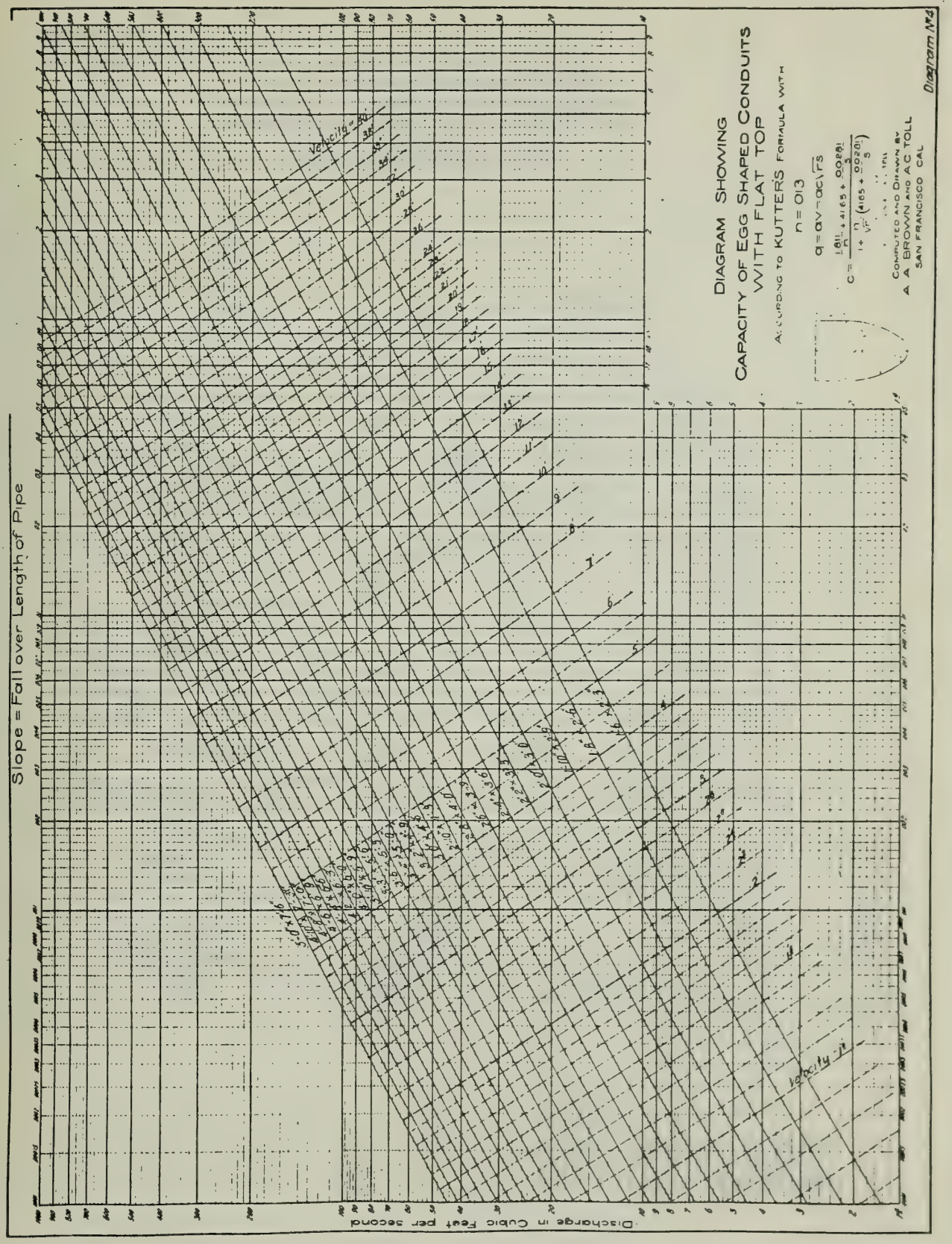
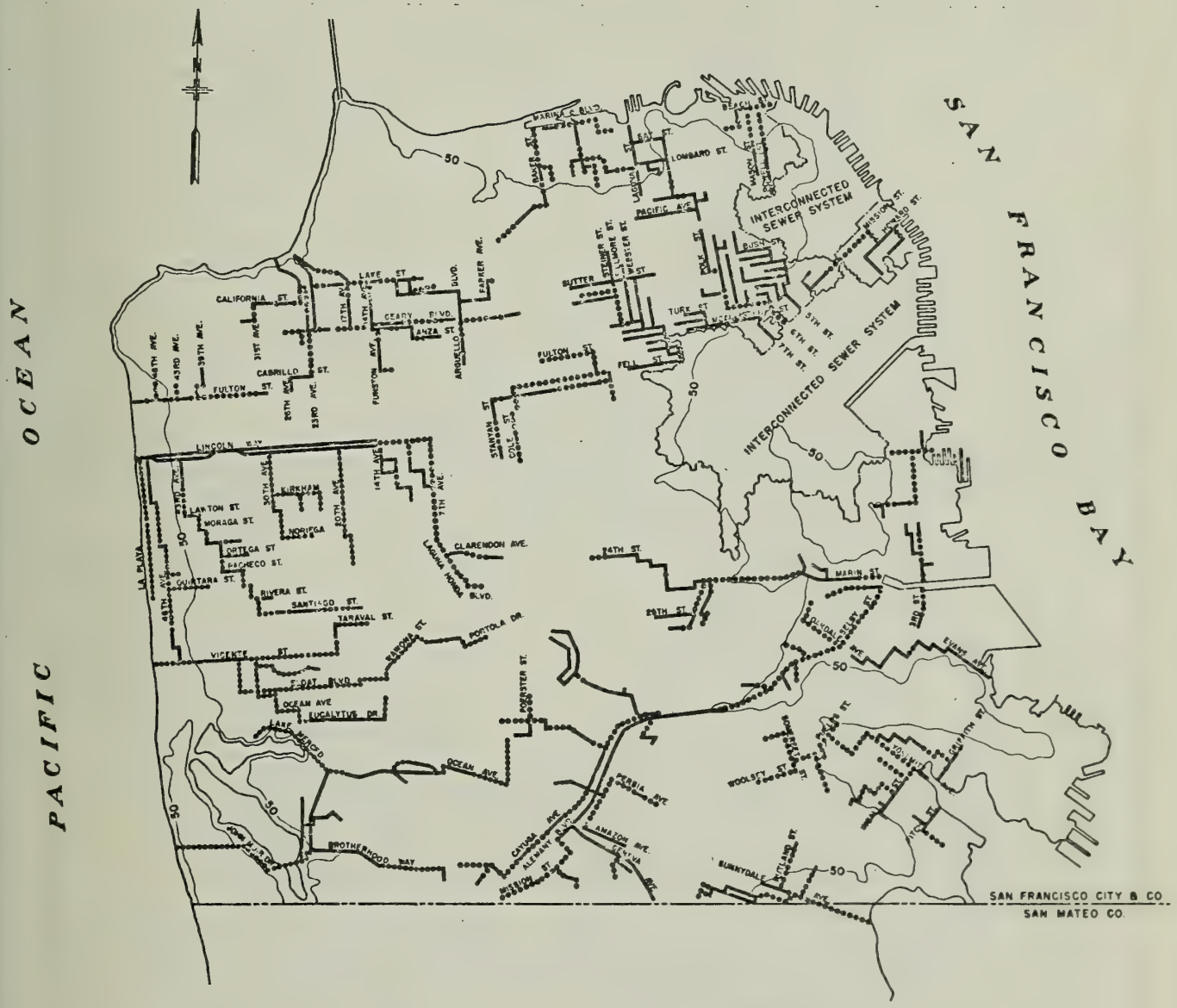


DIAGRAM SHOWING
CAPACITY OF EGG SHAPED CONDUITS
WITH FLAT TOP
ACCORDING TO KUTTER'S FORMULA WITH
n = 013
q = av = ac√rs
C = 1.811 + 41.65 + .0028/n / (1 + n/√r (41.65 + .00281/s))
COMPUTED AND DRAWN BY
A. A. BROWN AND A.C. TOLL
SAN FRANCISCO CAL.
Diagram No 5
Slope = Fall over Length of Pipe
Discharge in Cubic Feet per second
Velocity in Ft.

CITY & COUNTY OF SAN FRANCISCO
LOCATION OF ADEQUATE & INADEQUATE
MAJOR TRANSPORT SEWERS



LEGEND

- ADEQUATE TRANSPORT SEWERS (5 YEAR STORM FLOW)
- INADEQUATE TRANSPORT SEWERS

HORTON'S VALUES OF "n"

(TO BE USED WITH KUTTER'S AND MANNING'S FORMULAS)

SURFACE	BEST	GOOD	FAIR	BAD
Uncoated cast-iron pipe	0.012	0.013	0.014	0.015
Coated cast-iron pipe	0.011	0.012*	0.013*	
Commercial wrought-iron pipe, black	0.012	0.013	0.014	0.015
Commercial wrought-iron pipe, galvanized	0.013	0.014	0.015	0.017
Smooth brass and glass pipe	0.009	0.010	0.011	0.013
Smooth lockbar and welded "OD" pipe	0.010	0.011*	0.013*	
Riveted and spiral steel pipe	0.013	0.015	0.017*	
Vitrified sewer pipe	(0.010) (0.011)	0.013*	0.015	0.017
Common clay drainage tile	0.011	0.012*	0.014*	0.017
Glazed brickwork	0.011	0.012	0.013*	0.015
Brick in cement mortar; brick sewers	0.012	0.013	0.015*	0.017
Neat cement surfaces	0.010	0.011	0.012	0.013
Cement mortar surfaces	0.011	0.012	0.013*	0.015
Concrete pipe	0.012	0.013	0.015*	0.016
Wood stave pipe	0.010	0.011	0.012	0.013
Plank Flumes: Planed	0.010	0.012*	0.013	0.014
" " Unplaned	0.011	0.013*	0.014	0.015
" " With battens	0.012	0.015*	0.016	
Concrete-lined channels	0.012	0.014*	0.016*	0.018
Cement-rubble surface	0.017	0.020	0.025	0.030
Dry-rubble surface	0.025	0.030	0.033	0.035
Dressed-ashlar surface	0.013	0.014	0.015	0.017
Semicircular metal flumes, smooth	0.011	0.012	0.013	0.015
Semicircular metal flumes, corrugated	0.0225	0.025	0.0275	0.030
Canals and Ditches: Earth, straight and uniform	0.017	0.020	0.0225*	0.025
" " Rock cuts, smooth and uniform	0.025	0.030	0.033*	0.035
" " Rock cuts, jagged and irregular	0.035	0.040	0.045	
" " Winding sluggish canals	0.0225	0.025*	0.0275	0.030
" " Dredged earth channels	0.025	0.0275*	0.030	0.033
" " Canals with rough stony beds, weeds on earth banks	0.025	0.030	0.035*	0.040
" " Earth bottom, rubble sides	0.028	0.030*	0.033*	0.035
Natural Stream Channels: (1) Very weedy reaches	0.075	0.100	0.125	0.150
(2) Clean, straight bank, full stage, no rifts or deep pools	0.025	0.0275	0.030	0.033
(3) Same as (2), but some weeds and stones	0.030	0.033	0.035	0.040
(4) Winding; some pools and shoals, clean	0.033	0.035	0.040	0.045
(5) Same as (4), lower stages, more ineffective slope and sections	0.040	0.045	0.050	0.055
(6) Same as (4), some weeds and stones	0.035	0.040	0.045	0.050
(7) Same as (5), stony sections	0.045	0.050	0.055	0.060
(8) Sluggish river reaches, rather weedy or with very deep pools	0.050	0.060	0.070	0.080
* Values commonly used in designing				

ANALYSIS ON STORAGE CAPACITY

VS.

TREATMENT RATE

STORAGE CAPACITY VS. TREATMENT RATE ANALYSES

To meet the required time schedule for the development of the Master Plan for solving dry and wet weather pollution problems of the City and County of San Francisco, it was imperative that the available basic rainfall information be subjected to comprehensive analysis. Of prime significance were the effects of imposing various treatment rates and storage capacities on the historical rainfall data and then determining the number of overflows to be expected from the City's sewerage analysis system, based upon the results of the history.

A computer program was devised to model the storage/treatment process for combined overflow control. The program was used in conjunction with 62 years of U. S. Weather Bureau hourly rainfall data and 21 years of rainfall data from the Richmond-Sunset Water Pollution Control Plant to route storms of record through the storage/treatment process.

The rainfall at time T is noted and the amount of rain treated is subtracted. If there is more rain than can be treated, the excess goes to storage. If the total rainfall at time T exceeds both treatment and storage, an overflow

occurs. The amount of overflow at time T is that rainfall which exceeds the treatment and storage. A rainfall event ends when the storage is empty (i.e. when the rainfall treated equals the total rainfall at time T).

Shown in Plate 1 to 71 are summaries made for a particular treatment rate in inches/hour and storage capacity in inches based on 62 years of U. S. Weather Bureau record. Also shown are charts showing the relationship of the percentage of storage capacity utilized vs. the percent of time such storage (or less) was utilized. Plate 72 to 126 show summaries based on 21 years of record at the Richmond-Sunset Water Pollution Control Plant. A graphical illustration of the storage/treatment process model is shown in Plate 127.

PLATE 1

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 02 HUNDRETHS OF AN INCH PER HOUR. PAGE 103
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	RAINFALL DURATN	RAINFALL HOURS	RAINFALL QUANTY	HRS TO EMPTY	STORAGE DURATN	STORAGE MAX	OVERFLOW NO	OVERFLOW ST	OVERFLOW DUR	OVERFLOW WSTE	OVERFLOW INTL	TREATMENT HOURS	TREATMENT QUANTY	AGE OF STORAGE AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 5071 EVENTS				55.9**	2.5	2.5	22.0	0.0	2.5	0.0	0.0*					4.7	7.9	0.5	0.0	0.0	0.0	0.0
AVERAGE 5071 OVERFLOW EVENTS					2.5	2.5	22.0	0.0	2.5	0.0*	1.0	2.5	17.0	11.2		4.7	7.9	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 43 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 81.790
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 81.790
AVERAGE ANNUAL OVERFLOW, IN INCHES = 13.884

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= ~~2113~~ HUNDRETHS OF AN INCH PER HOUR. PAGE 77
STORAGE CAPACITY= 2 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	RAINFALL DURATN	RAINFALL HOURS	RAINFALL QUANTY	HRS TO EMPTY	STORAGE DURATN	STORAGE MAX	OVERFLOW NO	OVERFLOW ST	OVERFLOW DUR	OVERFLOW WSTE	OVERFLOW INTL	TREATMENT HOURS	TREATMENT QUANTY	AGE OF STORAGE AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1798 EVENTS				72.5**	4.4	4.3	30.8	0.9	5.3	1.9	1.0*					7.2	12.7	1.3	3.1	3.3	1.7	1.8
AVERAGE 3299 OVERFLOW EVENTS					4.9	4.8	34.8	0.9	5.8	1.0*	1.2	3.9	23.6	12.4		7.7	13.7	1.3	3.5	3.7	1.9	1.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 43 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 61.258
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 53.210
AVERAGE ANNUAL OVERFLOW, IN INCHES = 12.538

TITLE DESCRIPTIONS

1 EVENT = SEQUENCING NUMBER.
2 DAY = DAY THIS EVENT BEGAN. REFERENCED FROM JANUARY 1, 1901.
3 DATE = DATE THIS EVENT BEGAN.
4 HR = NUMBER OF HOURS PAST MIDNIGHT THIS EVENT BEGAN.
5 HRS NO STORAG = NUMBER OF HOURS SINCE END OF LAST EVENT, EXCLUDING SUMMER (MORE THAN 1000 HOURS).

6 DURATN = DURATION OF STORM FROM FIRST HOUR OF RAIN TO LAST HOUR OF RAIN.
7 HOURS = NUMBER OF HOURS IN WHICH RAINFALL OCCURRED DURING EVENT.
8 QUANTY = AMOUNT OF RAINFALL DURING THE EVENT IN HUNDRETHS OF AN INCH.
9 HRS TO EMPTY = NUMBER OF HOURS FROM LAST RAINFALL TO END OF EVENT.

10 DURATN = TOTAL NUMBER OF HOURS STORAGE WAS UTILIZED. IE, LENGTH OF THE EVENT.
11 MAX = MAXIMUM AMOUNT OF STORAGE UTILIZED, IN HUNDRETHS OF AN INCH.

12 NO = OVERFLOW EVENT SEQUENCING NUMBER.
13 ST = NUMBER OF HOURS ELAPSED WHEN OVERFLOW OCCURRED. OR, IF NO OVERFLOW, HOUR MAXIMUM STORAGE BEGAN.

14 DUR = NUMBER OF HOURS IN WHICH OVERFLOW OCCURED.
15 WSTE = QUANTITY OF WATER RELEASED UNTREATED, IN HUNDRETHS OF AN INCH.
16 INTL = QUNTITY OF WATER RELEASED UNTREATED DURING THE FIRST 3 HOURS OF OVERFLOW.

17 HOURS = NUMBER OF HOURS WATER WAS TREATED DURING THE PRESENT EVENT AND SINCE THE PREVIOUS EVENT.
18 QUANTY = QUANTITY OF WATER TREATED DURING THE EVENT AND SINCE THE PREVIOUS EVENT.
19 AGE1 = AVERAGE AGE OF TREATMENT.

20 AGE2 = HOURLY MAXIMUM AGE OF STORAGE ON FIRST IN, FIRST OUT BASIS.
21 AGE3 = HOURLY MAXIMUM AGE OF STORAGE ON FIRST IN, LAST OUT BASIS.
22 AGE4 = QUANTITY WEIGHTED AVERAGE AGE OF STORAGE ON FIRST IN, FIRST OUT BASIS.
23 AGE5 = QUANTITY WEIGHTED AVERAGE AGE OF STORAGE ON FIRST IN, LAST OUT BASIS.

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 ~~074~~ HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 6 HUNDRETHS OF AN INCH.

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	DURATN HOURS	--RAINFALL-- QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 3246 EVENTS		82.3**	6.0	5.4	36.4	2.0	8.0	4.7	1.3*							9.9	18.0	2.4	4.5	6.1	2.3	2.5
AVERAGE 2059 OVERFLOW EVENTS			8.2	7.3	53.8	2.5	10.7	2.5*	2.0	4.9	32.8	16.5				12.5	23.4	3.2	6.3	8.6	3.1	3.5

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 43 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 52.355
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 33.210
AVERAGE ANNUAL OVERFLOW, IN INCHES = 10.897

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= ~~21535~~ HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 8 HUNDRETHS OF AN INCH.

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	DURATN HOURS	--RAINFALL-- QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 3128 EVENTS		84.5**	6.5	5.7	37.9	2.5	9.0	5.9	1.5*							10.9	19.9	2.9	5.1	7.0	2.5	2.8
AVERAGE 1805 OVERFLOW EVENTS			9.5	8.2	60.4	3.2	12.8	3.0*	2.4	5.1	35.3	17.5				14.6	27.5	4.1	7.5	10.6	3.6	4.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 43 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 50.452
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 29.113
AVERAGE ANNUAL OVERFLOW, IN INCHES = 10.276

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= ~~2295~~ HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	DURATN HOURS	--RAINFALL-- QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 3025 EVENTS		86.4**	7.0	6.0	39.3	2.9	9.9	7.0	1.6*							11.8	21.7	3.4	5.5	8.0	2.7	3.1
AVERAGE 1598 OVERFLOW EVENTS			10.9	9.1	67.0	4.0	14.9	3.6*	2.7	5.4	37.8	18.4				16.7	31.6	5.0	8.6	12.7	4.1	4.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 43 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 48.790
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 25.774
AVERAGE ANNUAL OVERFLOW, IN INCHES = 9.732

PLATE 2

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 400 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	**	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2173 EVENTS				102.9**	17.7	9.0	55.6	10.4	28.0	30.5	8.4*				29.9	58.0	6.2	14.4	24.1	6.1	8.1
AVERAGE 2 OVERFLOW EVENTS				258.0	75.0	734.0	100.5	354.5	30.2*	144.5	3.5	25.0	25.0	355.5	710.0	126.5	166.5	315.1	68.5	110.3	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.048
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .032
AVERAGE ANNUAL OVERFLOW, IN INCHES = .008

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 350 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	**	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2173 EVENTS				103.0**	17.6	9.0	55.6	10.4	28.0	30.4	8.1*				29.9	57.9	6.2	14.4	24.1	6.1	8.1
AVERAGE 6 OVERFLOW EVENTS				281.8	95.7	812.5	107.8	389.7	29.5*	124.5	5.5	33.7	14.5	390.3	779.5	75.7	131.5	277.3	54.3	85.7	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.048
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .097
AVERAGE ANNUAL OVERFLOW, IN INCHES = .033

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 370 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	**	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2173 EVENTS				102.9**	17.6	9.0	>5.6	10.4	28.0	30.5	8.3*				29.9	58.0	6.2	14.4	24.1	6.1	8.1
AVERAGE 3 OVERFLOW EVENTS				216.7	84.7	737.0	132.0	348.7	30.0*	42.0	6.3	40.0	19.3	350.0	698.3	100.6	136.3	279.2	60.2	92.0	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.048
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.048
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.019

PLATE 3

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE--		--O V E R F L O W--		T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
AVERAGE 2197 EVENTS			102.5**	16.8	8.9	54.9	10.2	27.0	29.4	6.8*		28.9	56.0	6.0	14.2	23.7	6.1	8.0
AVERAGE 37 OVERFLOW EVENTS			171.2	67.2	536.9	55.3	226.5	26.5*	59.3	10.5	84.5 31.6	228.1	454.5	41.8	88.7	198.6	41.3	64.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.435
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .597
AVERAGE ANNUAL OVERFLOW, IN INCHES = .504

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE--		--O V E R F L O W--		T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
AVERAGE 2182 EVENTS			102.9**	17.2	8.9	55.3	10.3	27.6	30.0	7.2*		29.5	57.0	6.1	14.3	23.9	6.1	8.1
AVERAGE 24 OVERFLOW EVENTS			232.4	82.4	650.6	59.0	291.4	27.5*	69.0	10.1	68.4 23.3	293.0	584.4	53.2	100.3	225.6	46.0	73.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.194
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .387
AVERAGE ANNUAL OVERFLOW, IN INCHES = .265

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 45
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE--		--O V E R F L O W--		T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
AVERAGE 2177 EVENTS			102.9**	17.5	9.0	55.5	10.4	27.8	30.3	7.5*		29.7	57.6	6.1	14.3	24.0	6.1	8.1
AVERAGE 15 OVERFLOW EVENTS			301.5	102.3	792.7	73.0	374.5	28.4*	88.2	7.9	84.1 14.1	376.1	750.7	52.7	111.0	265.0	49.0	82.2

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.113
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .242
AVERAGE ANNUAL OVERFLOW, IN INCHES = .107

PLATE 4

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 59
STORAGE CAPACITY= 15 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT	--AGE OF STORAGE---				
		YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	#4	********5	******6	*****7	******8	******9	*****10	#11	#12	13 #14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2853 EVENTS				90.4**	8.2	6.4	41.8	3.7	11.8	9.4	1.8*			13.7	25.5	4.4	6.6	9.9	3.1	3.7
AVERAGE 1276 OVERFLOW EVENTS				14.2	10.9	80.9	5.7	19.9	4.0*	3.7	5.7	41.7 19.8		21.6	41.4	7.3	11.3	17.7	5.3	6.3

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 46.016
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 20.581
AVERAGE ANNUAL OVERFLOW, IN INCHES = 8.588

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 56
STORAGE CAPACITY= 20 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT	--AGE OF STORAGE---				
		YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	#4	********5	******6	*****7	******8	******9	*****10	#11	#12	13 #14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2724 EVENTS				93.7**	9.1	6.8	43.9	4.3	13.5	11.5	2.1*			15.3	28.9	1.3	7.5	11.5	3.5	4.2
AVERAGE 1075 OVERFLOW EVENTS				17.6	12.6	93.1	7.1	24.7	5.9*	4.6	6.0	44.1 20.4		26.5	51.2	2.0	13.8	22.3	6.3	7.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 42 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 43.935
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 17.339
AVERAGE ANNUAL OVERFLOW, IN INCHES = 7.650

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 53
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71134

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT	--AGE OF STORAGE---				
		YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	#4	********5	******6	*****7	******8	******9	*****10	#11	#12	13 #14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2566 EVENTS				99.9**	10.6	7.3	46.7	5.6	16.1	15.0	2.7*			18.0	34.2	3.7	8.9	14.1	4.1	5.0
AVERAGE 768 OVERFLOW EVENTS				23.7	15.6	118.2	10.7	34.3	8.5*	6.2	6.5	50.0 22.4		36.1	70.5	7.4	18.0	31.7	8.5	10.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 42 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 41.387
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 12.387
AVERAGE ANNUAL OVERFLOW, IN INCHES = 6.193

PLATE 5

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= ~~2910~~2 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. 62YR SF FED BLDG

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	*4	********5	******6	*****7	******8	******9	*****10	*11	*12	13	*14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2406 EVENTS			98.1**	12.4	7.9	50.0	7.3	19.8	19.7	3.4*				21.6	41.4	0.8	10.7	17.8	4.8	6.1
AVERAGE 478 OVERFLOW EVENTS				36.6	21.4	163.5	17.8	54.4	12.2*	9.9	7.1	55.2	22.8	56.3	110.7	1.4	27.7	52.1	12.6	16.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 46 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.806
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 7.710
AVERAGE ANNUAL OVERFLOW, IN INCHES = 4.254

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 47
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	*4	********5	******6	*****7	******8	******9	*****10	*11	*12	13	*14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2273 EVENTS			100.6**	14.9	8.5	53.0	9.3	24.2	25.6	4.9*				26.1	50.3	5.4	13.0	21.7	5.6	7.3
AVERAGE 175 OVERFLOW EVENTS				76.6	37.3	286.8	33.3	109.9	19.4*	22.1	8.7	67.6	25.5	111.7	221.6	22.5	49.7	102.3	22.6	32.6

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.661
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.823
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.907

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 46
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2	******3	*4	********5	******6	*****7	******8	******9	*****10	*11	*12	13	*14	**15	**16	***17	*****18	**19	**20	**21	**22	**23
AVERAGE 2215 EVENTS			102.0**	16.2	8.8	54.5	10.0	26.2	28.1	5.9*				28.1	54.3	5.8	13.7	23.0	5.9	7.8
AVERAGE 77 OVERFLOW EVENTS				122.7	83.0	419.3	47.5	170.1	23.7*	42.2	9.0	79.6	27.6	171.7	341.8	31.9	69.0	146.0	30.7	47.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 44 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.726
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.242
AVERAGE ANNUAL OVERFLOW, IN INCHES = .926

PLATE 6

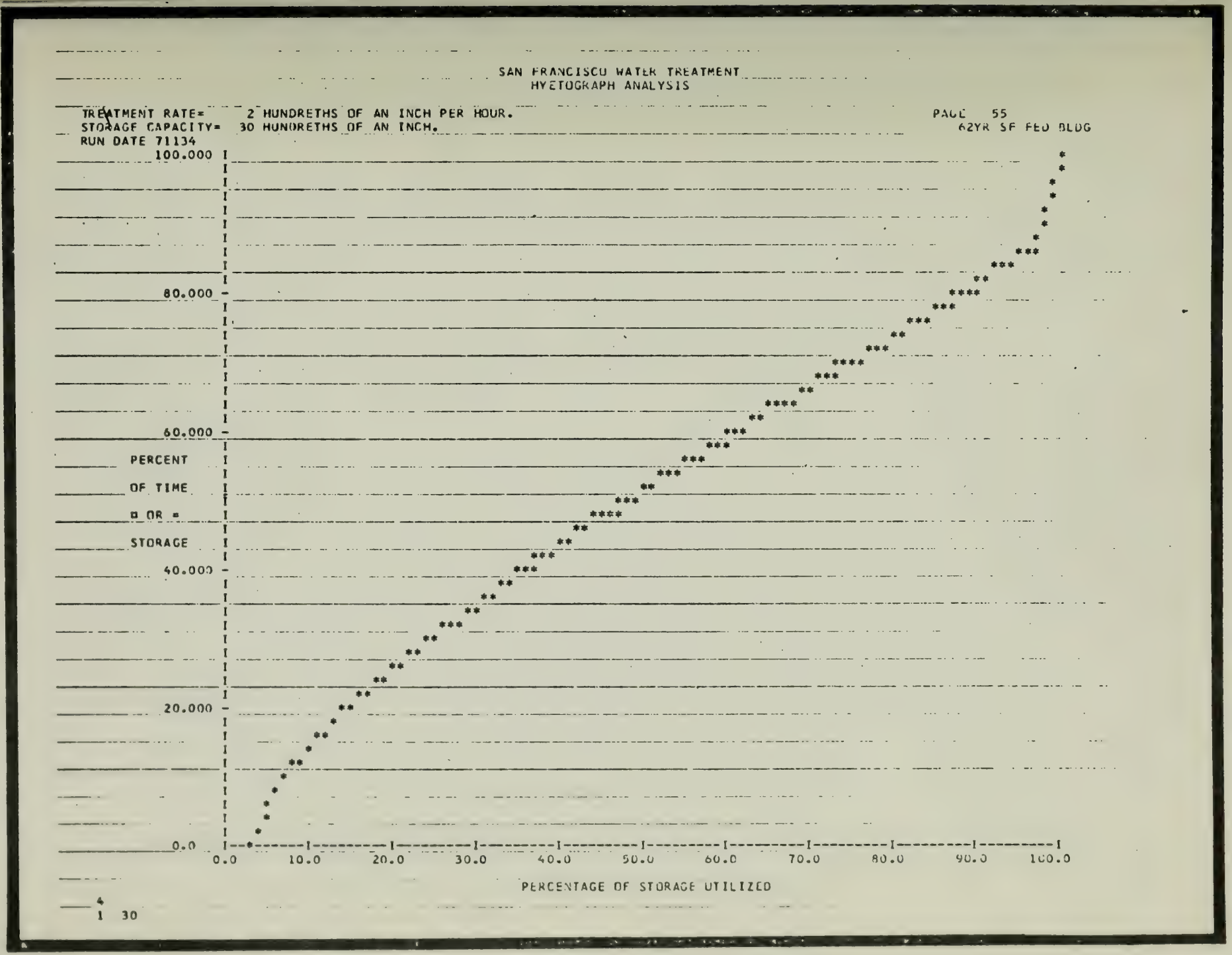

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134
PAGE 55
62YR SF FED BLDG
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
□ OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED
4
1 30

PLATE 7

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 23182 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.

PAGE 52
62YR SF FED BLDG

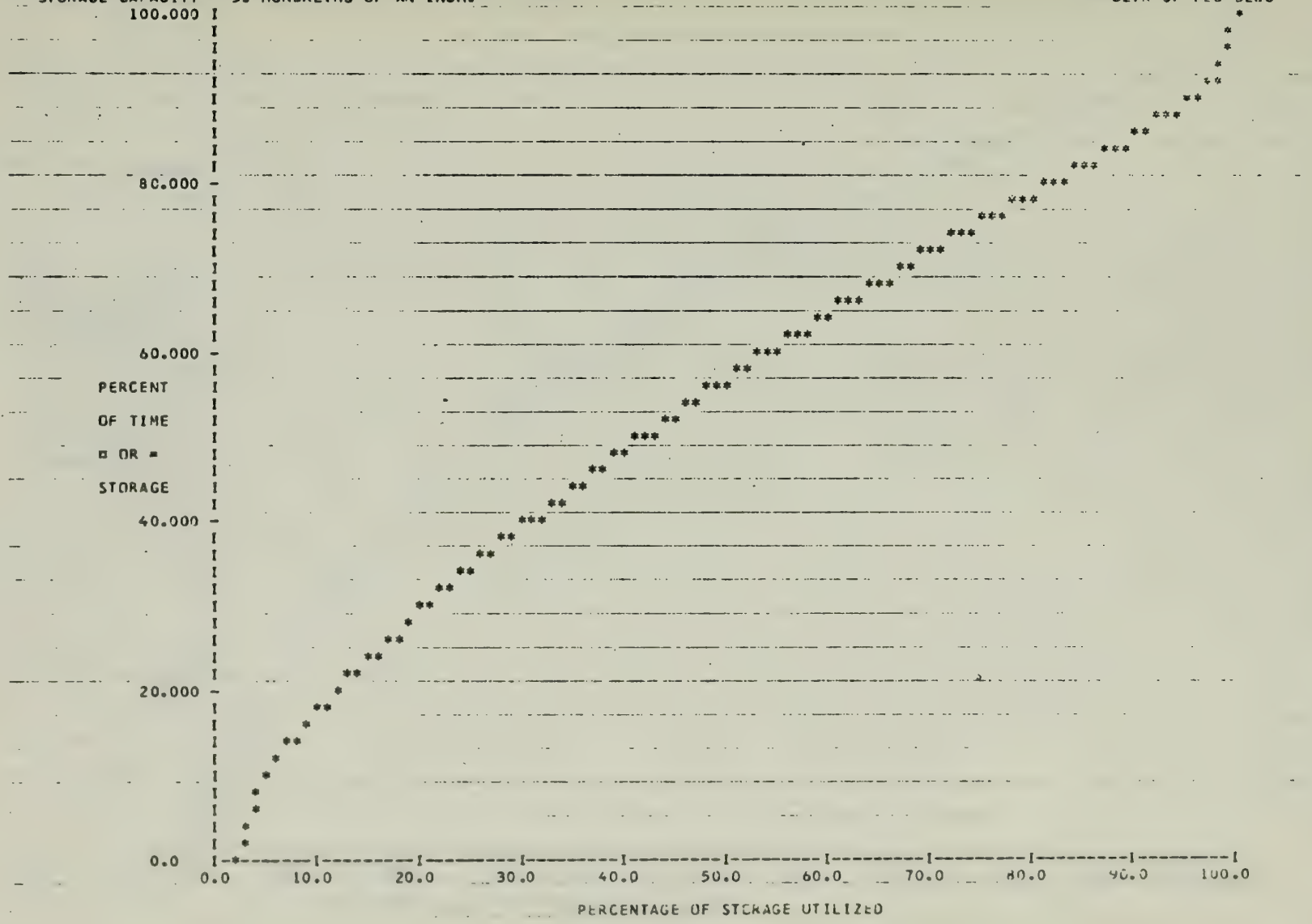
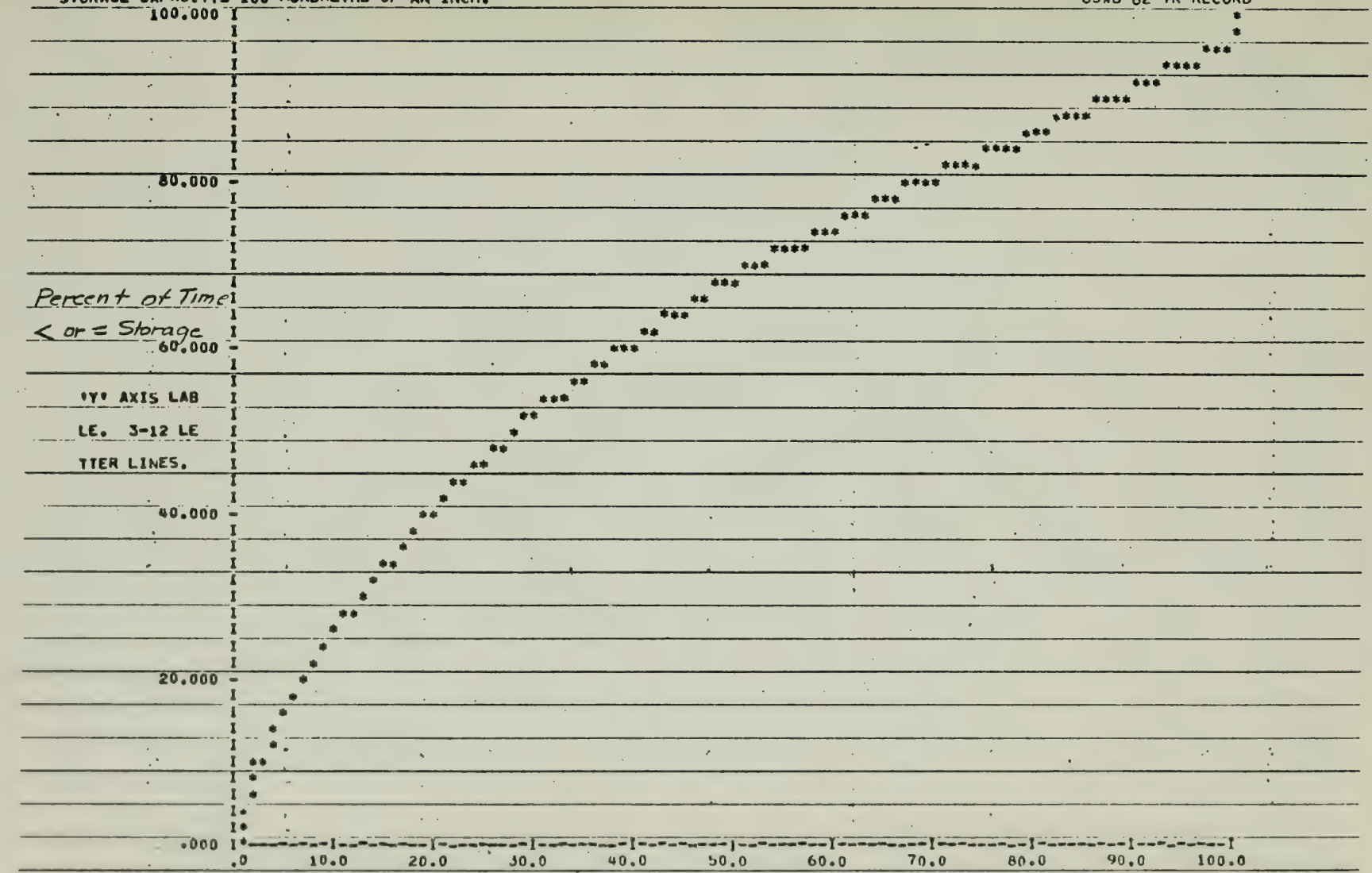


PLATE 8

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 49
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

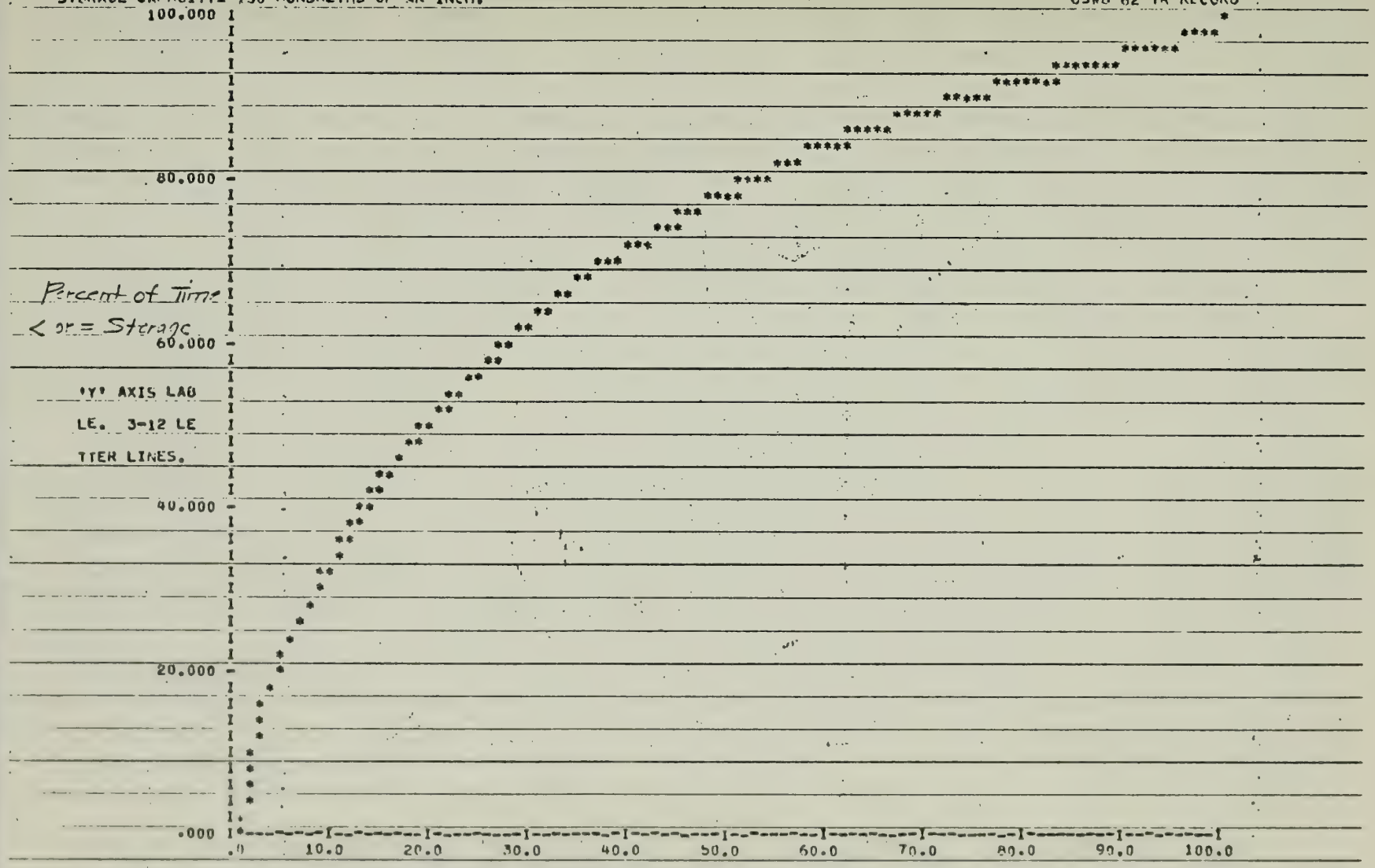
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 9

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.

USWB 62 YR RECORD



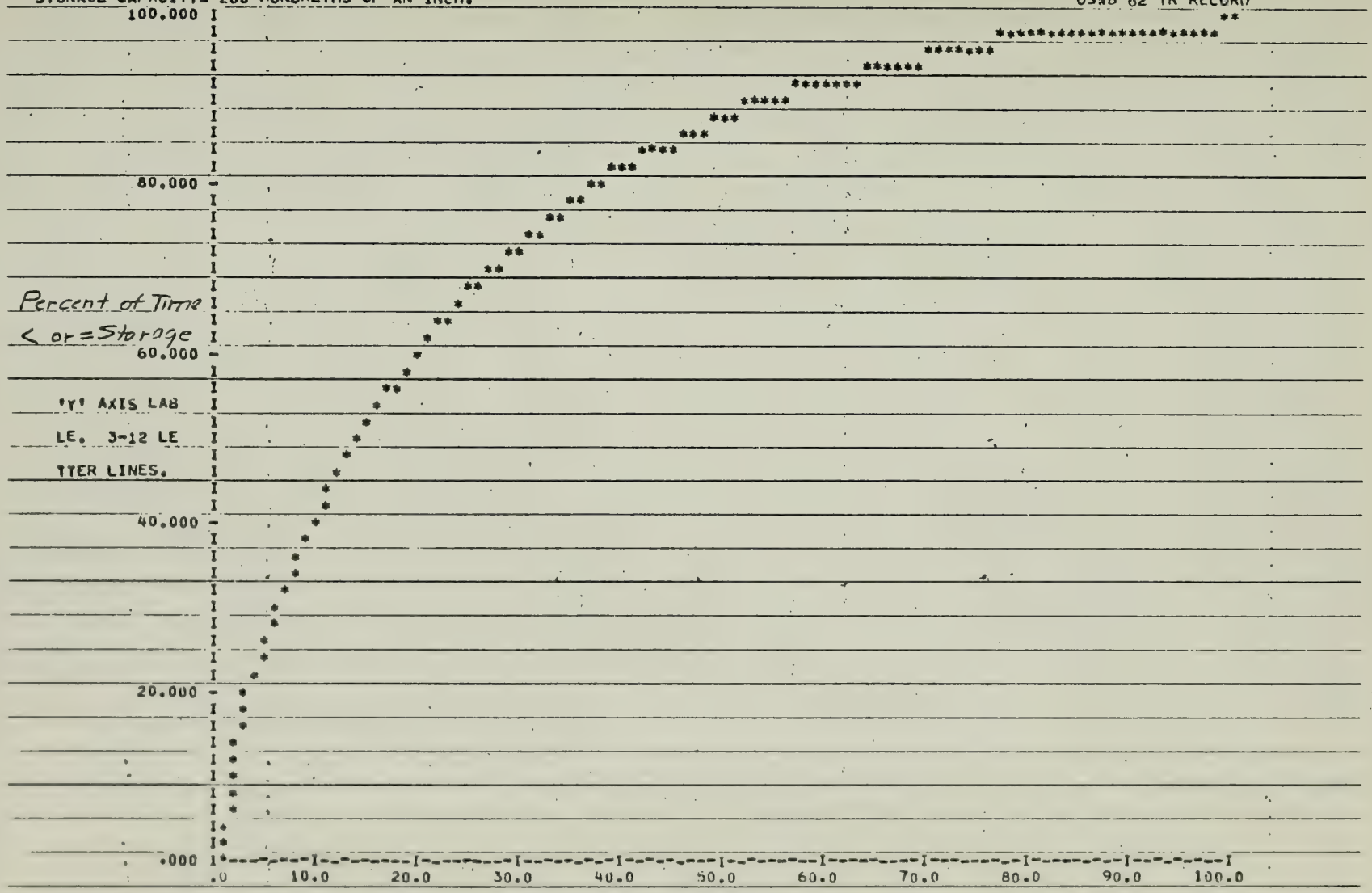
-12-

PLATE 10

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.

PAGE 47
USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

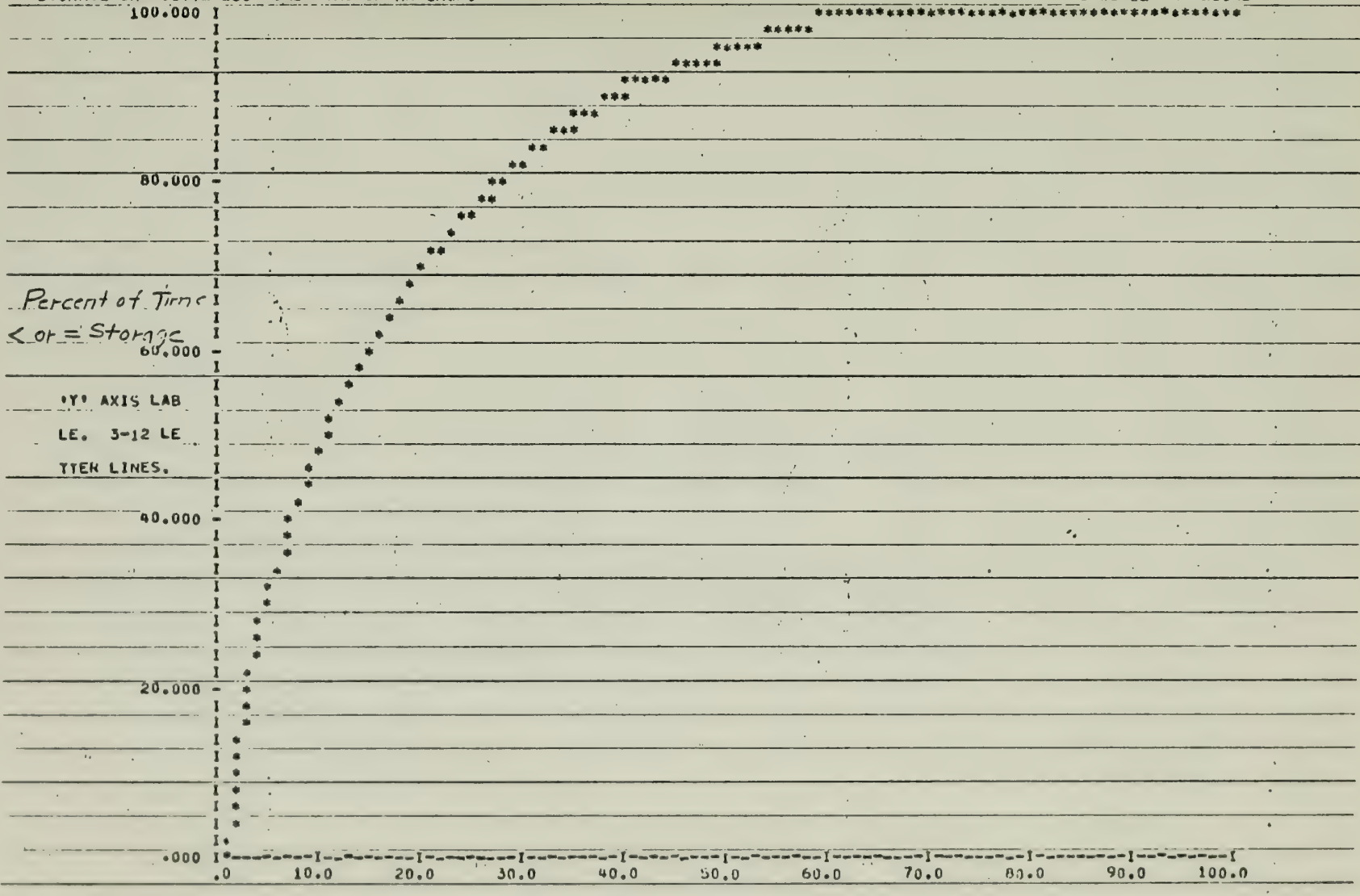
-13-

PLATE II

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH.

PAGE 47
USWB 62 YR RECORD



Percent of Time < or = Storage

'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

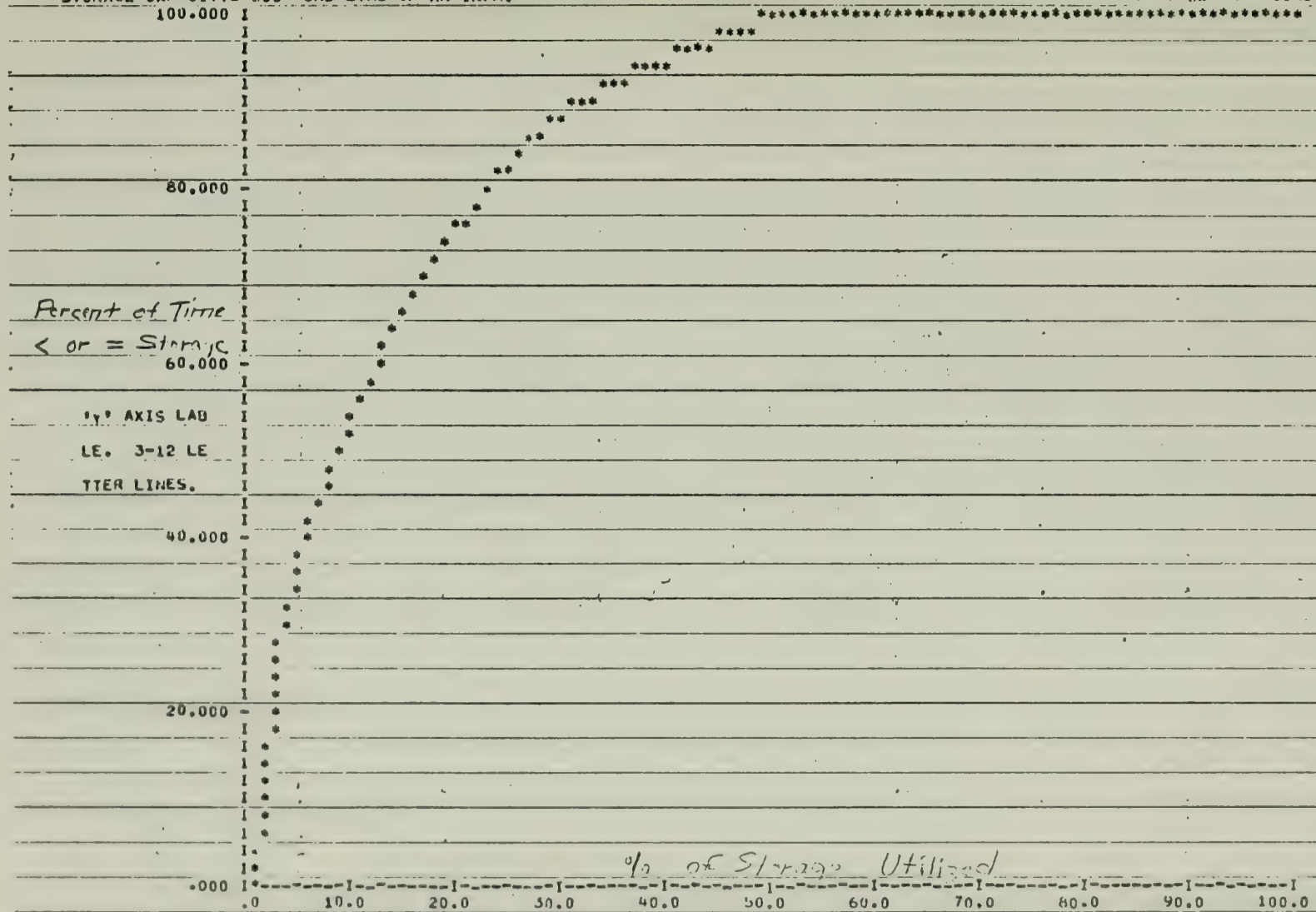
% of Storage Utilized

PLATE 12

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.

USWB 62 YR RECORD



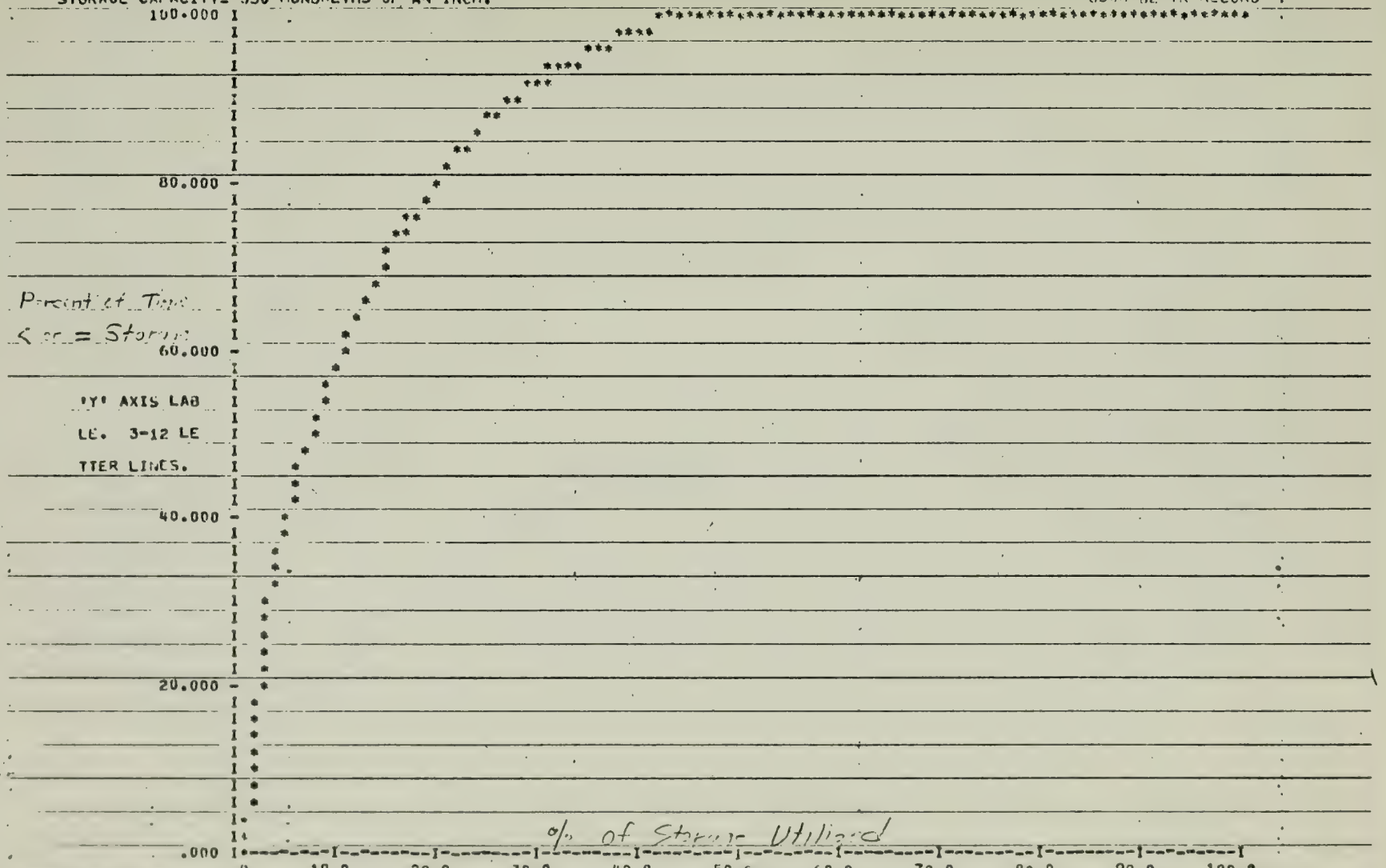
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 13

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 350 HUNDRETHS OF AN INCH.

PAGE 47
USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

-16-

PLATE 14

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 370 HUNDRETHS OF AN INCH.

62YR SF FED BLDG

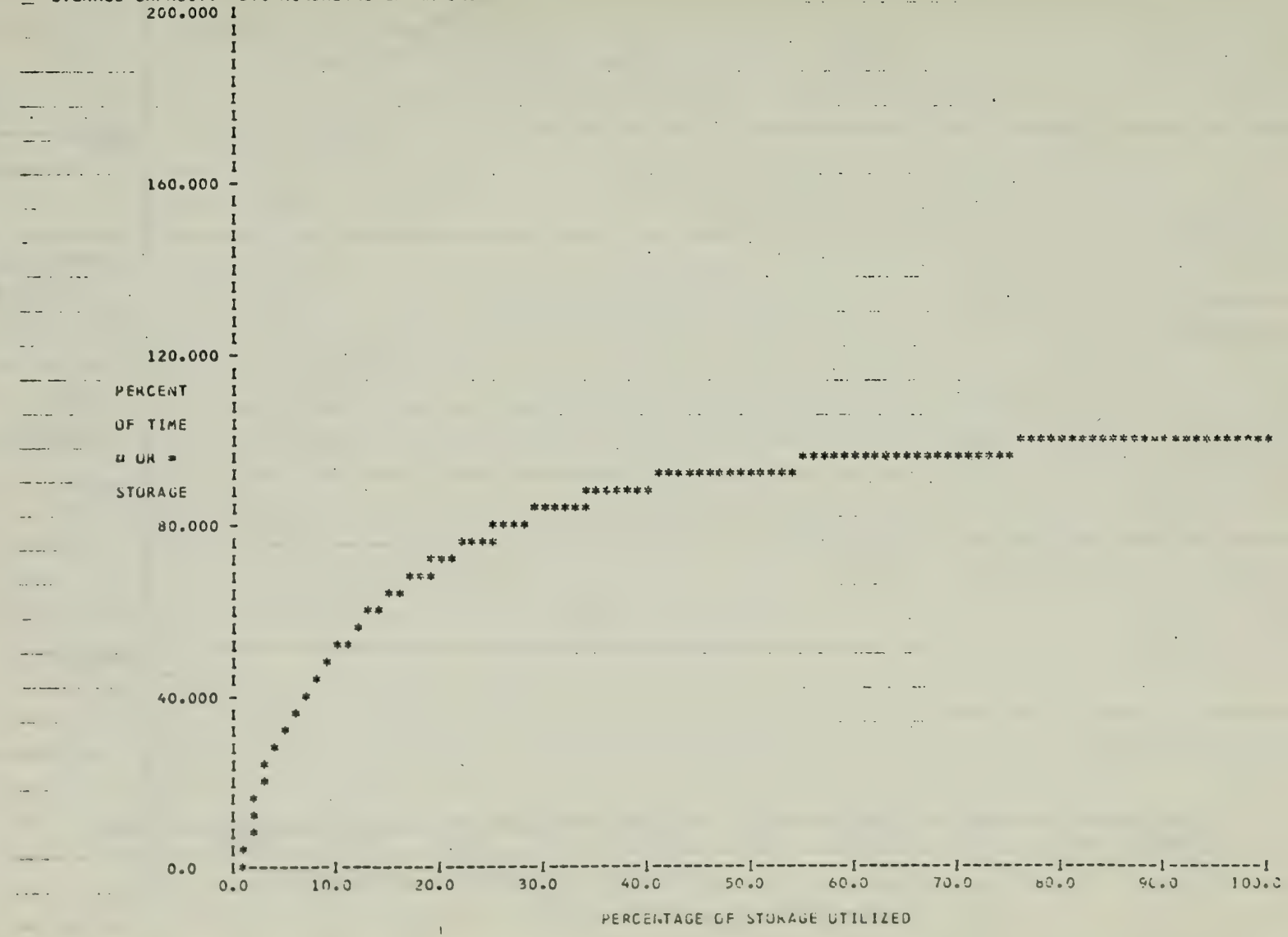
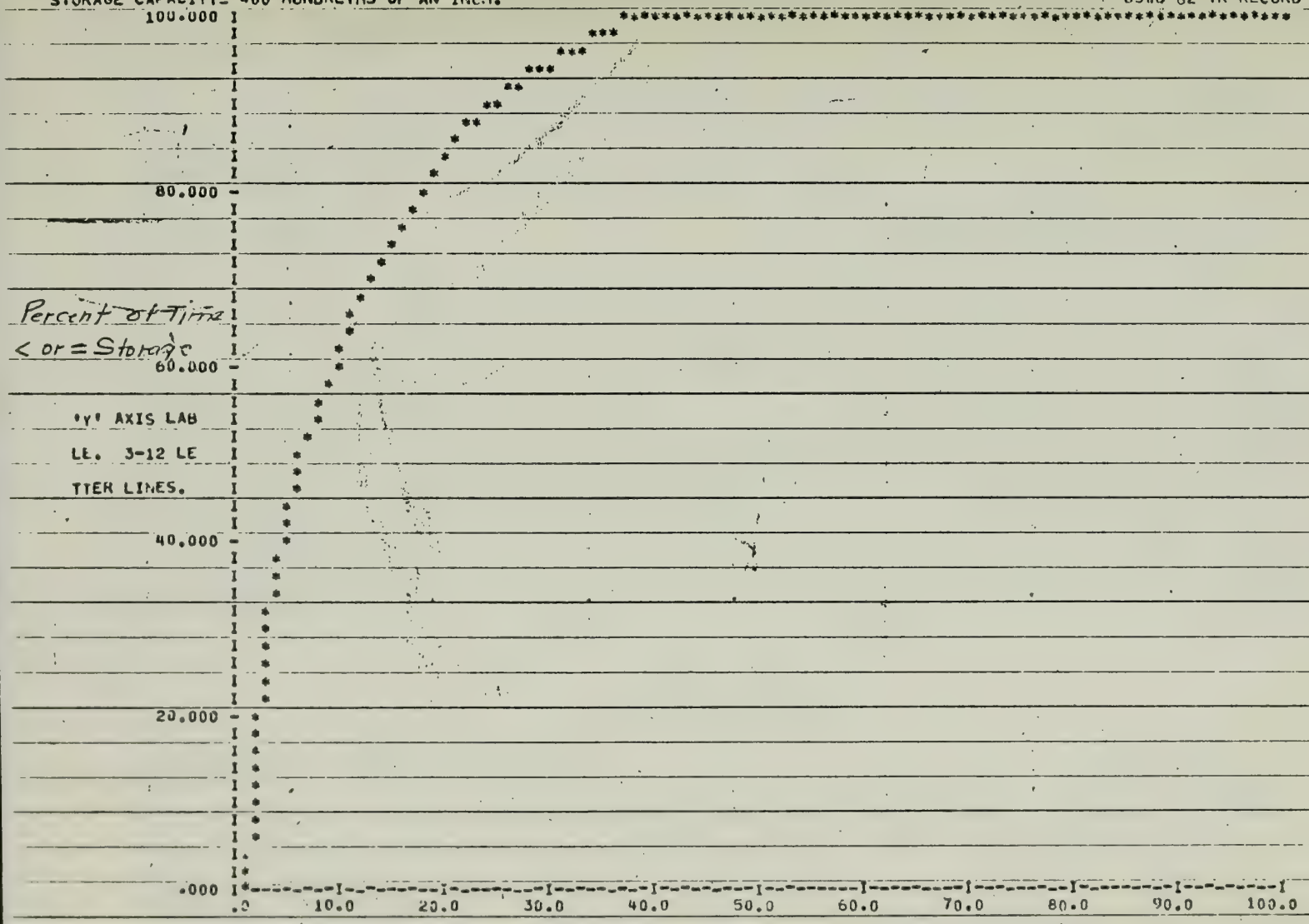


PLATE 15

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 400 HUNDRETHS OF AN INCH.

PAGE 47
USWB 62 YR RECORD



-18-

PLATE 16

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE EC
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71139

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 3937 EVENTS				65.5**	2.2	2.2	24.8	0.0	2.2	C.0	0.0*					6.0	16.C	C.5	C.C	C.0	C.C	0.0
AVERAGE 3937 OVERFLOW EVENTS					2.2	2.2	24.8	C.0	2.2	C.0*	1.0	2.2	16.0	11.8		6.0	16.C	C.5	C.0	C.0	C.C	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 32 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 63.500
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 63.500
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1C.151

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 54
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2626 EVENTS				93.1**	6.3	5.4	41.6	2.1	8.4	12.3	2.0*					11.9	38.3	1.2	4.4	6.4	2.1	2.5
AVERAGE 727 OVERFLOW EVENTS					13.0	10.8	101.5	4.0	17.0	7.4*	4.1	4.2	35.1	22.0		20.5	72.7	2.9	9.5	14.8	4.5	5.3

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 33 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 42.355
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 11.726
AVERAGE ANNUAL OVERFLOW, IN INCHES = 4.115

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 53
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71134

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2598 EVENTS				95.3**	6.5	5.5	42.1	2.3	8.8	13.6	2.1*					12.3	40.0	1.8	4.6	6.9	2.2	2.6
AVERAGE 622 OVERFLOW EVENTS					14.4	11.7	110.8	4.8	19.1	8.4*	4.7	4.2	35.7	22.2		22.7	81.4	3.9	10.8	17.1	5.1	6.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 33 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 41.903
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 10.032
AVERAGE ANNUAL OVERFLOW, IN INCHES = 3.578

PLATE 17

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 51
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
**1	**2	**3	*4	**5	**6	**7	**8	**9	**10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 2494 EVENTS				95.9**	7.3	5.9	44.1	2.7	10.117.3		2.6*					13.7	45.3	1.7	5.3	8.2	2.5	3.0
AVERAGE 337 OVERFLOW EVENTS					21.3	15.6	152.1	7.4	28.712.1*		7.0	4.6	38.6	23.1	32.2	119.6	5.6	15.8	26.6	7.2	9.0

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 33 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 40.226
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 5.435
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.101

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
**1	**2	**3	*4	**5	**6	**7	**8	**9	**10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 2445 EVENTS				96.9**	7.8	6.1	45.1	3.1	10.919.7		3.1*					14.6	48.7	1.9	5.7	9.0	2.7	3.3
AVERAGE 175 OVERFLOW EVENTS					30.1	21.0	203.8	11.3	41.415.4*		10.6	5.0	39.9	21.8	44.8	170.2	8.1	21.7	38.9	10.0	12.9

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 33 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 39.435
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.823
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.125

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
**1	**2	**3	*4	**5	**6	**7	**8	**9	**10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 2425 EVENTS				97.5**	8.1	6.1	45.5	3.2	11.421.0		3.4*					15.0	50.4	2.0	6.0	9.4	2.8	3.4
AVERAGE 88 OVERFLOW EVENTS					38.8	25.0	254.2	14.1	53.018.0*		14.9	5.3	44.0	21.5	56.7	216.9	10.9	27.5	50.4	12.7	16.8

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 32 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 39.113
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.419
AVERAGE ANNUAL OVERFLOW, IN INCHES = .624

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2412 EVENTS			97.8**	8.3	6.2 45.8	3.4	11.722.0		3.8*					15.3	51.7	2.1	6.1	9.7	2.8	3.5
AVERAGE 25 OVERFLOW EVENTS				57.3	36.4 380.0	23.8	81.020.6*		22.3	6.6	57.4	30.5		84.0	328.3	16.7	39.6	75.1	18.5	25.1

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 32 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.903
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .403
AVERAGE ANNUAL OVERFLOW, IN INCHES = .231

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2410 EVENTS			97.8**	8.4	6.2 45.8	3.4	11.822.3		3.9*					15.4	52.0	2.1	6.2	9.8	2.8	3.5
AVERAGE 11 OVERFLOW EVENTS				63.2	38.8 435.4	30.9	94.121.5*		22.6	8.5	60.5	30.1		97.5	381.0	21.6	53.1	87.1	23.0	28.9

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 32 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.871
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .177
AVERAGE ANNUAL OVERFLOW, IN INCHES = .107

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2405 EVENTS			97.9**	8.4	6.2 45.9	3.4	11.822.5		4.0*					15.5	52.3	2.1	6.2	9.8	2.8	3.5
AVERAGE 7 OVERFLOW EVENTS				73.4	38.3 457.6	34.6	108.021.8*		29.4	5.3	27.6	15.4		111.6	436.3	28.1	58.6	94.0	25.3	31.3

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 32 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.790
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .113
AVERAGE ANNUAL OVERFLOW, IN INCHES = .031

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 50
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL	HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	AGE3	AGE4	--AGE OF STORAGE-- AGE5
****1	****2	******3	**	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	****17	****18	**19	**20	**21	**22	**23
AVERAGE 2405 EVENTS				97.9**	8.4	6.2	45.9	3.4	11.9	22.5	4.0*					15.5	52.4	2.1	6.2	9.9	2.8	3.5
AVERAGE 1 OVERFLOW EVENTS					53.0	45.0	520.0	74.0	127.0	22.4*	46.0	3.0	12.0	12.0	127.0	508.0	32.0	75.5	125.5	32.2	42.1	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 32 DAY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.790
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .016
AVERAGE ANNUAL OVERFLOW, IN INCHES = .002

PLATE 20

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 56
USWB 62 YR RECORD

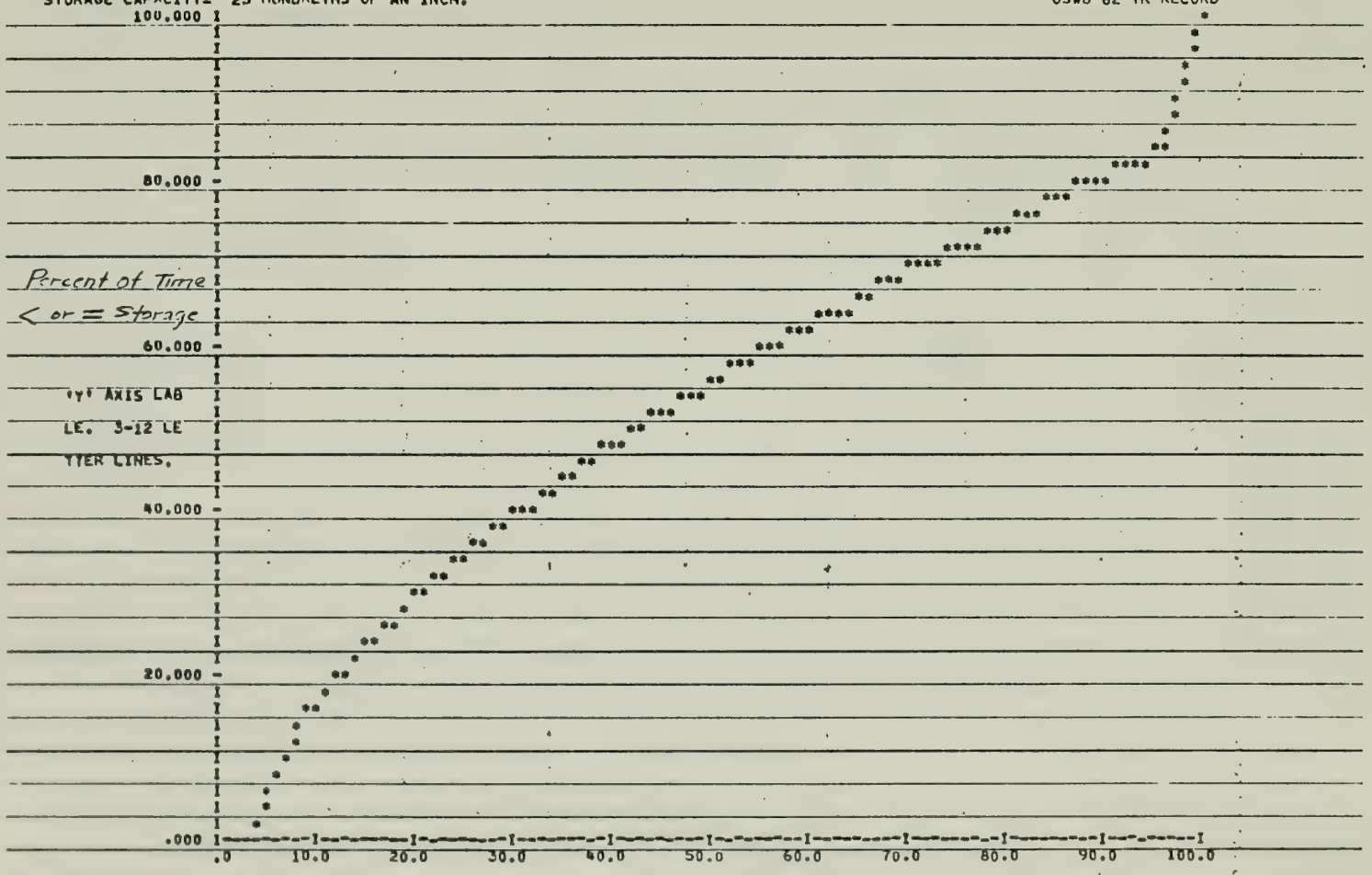
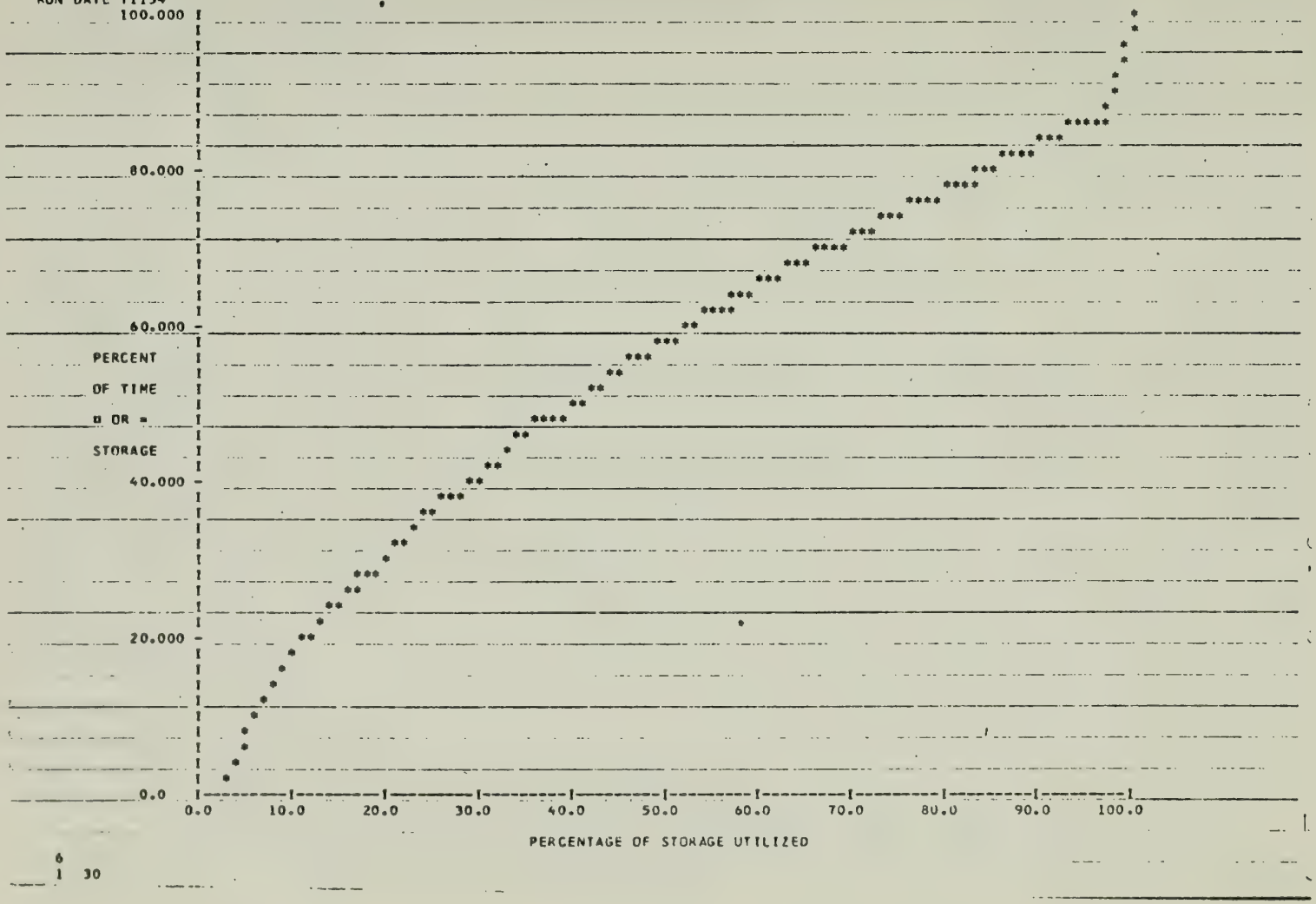


PLATE 21

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134

PAGE 55
62YR SF FED BLDG



6
1 30

PLATE 22

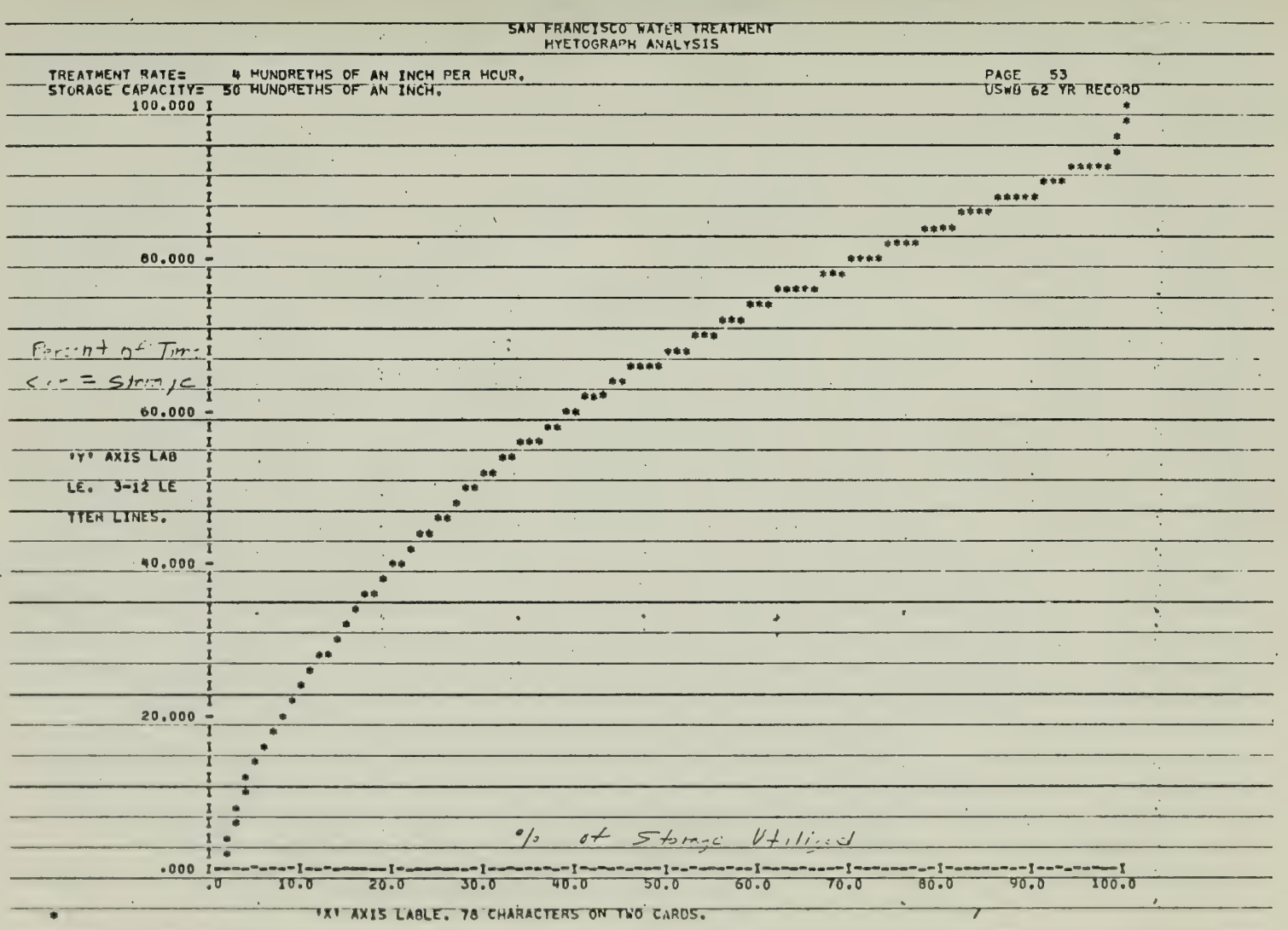

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
PAGE 53
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
<or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 23

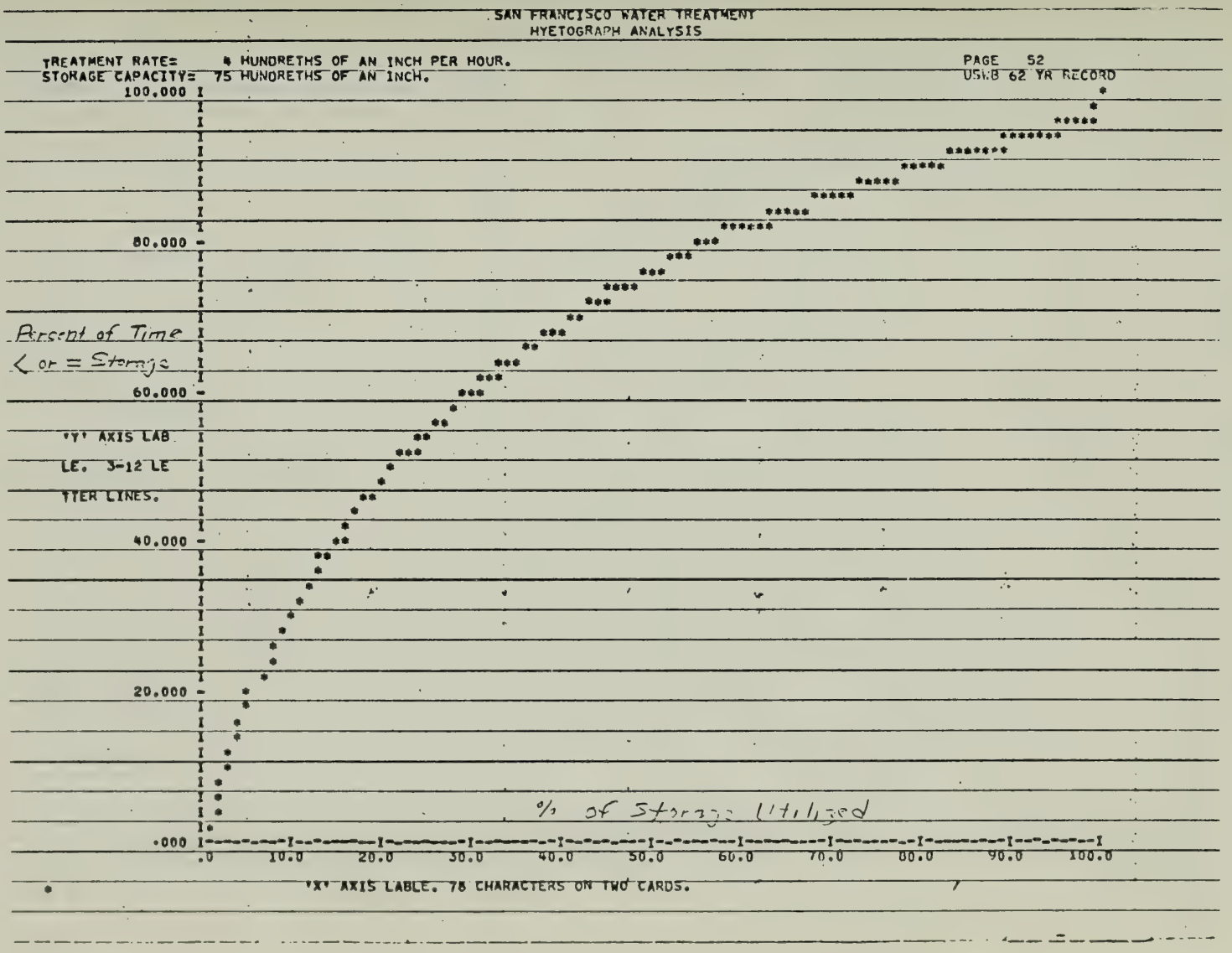

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
PAGE 52
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 24

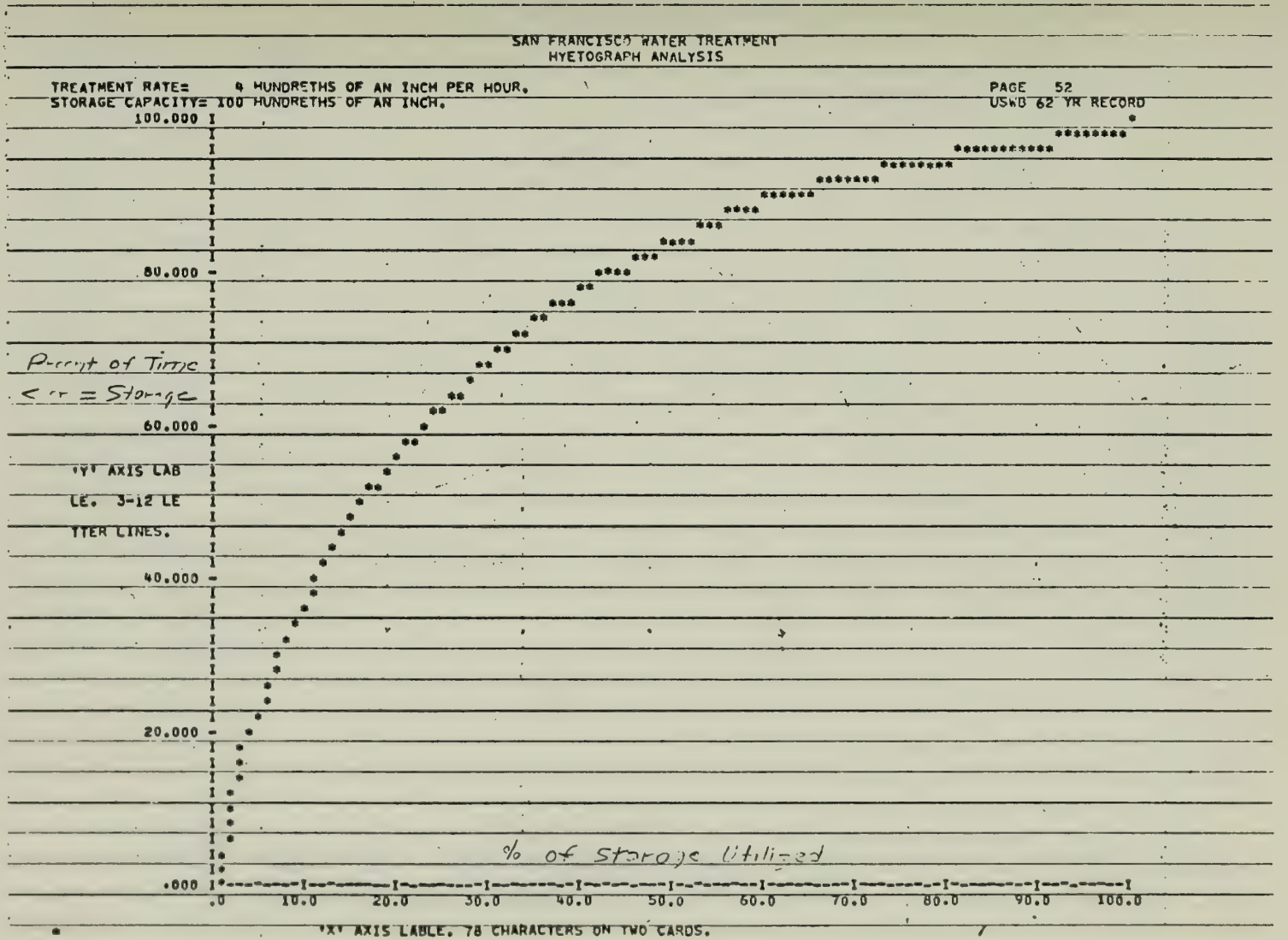

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
PAGE 52
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
<= = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 25

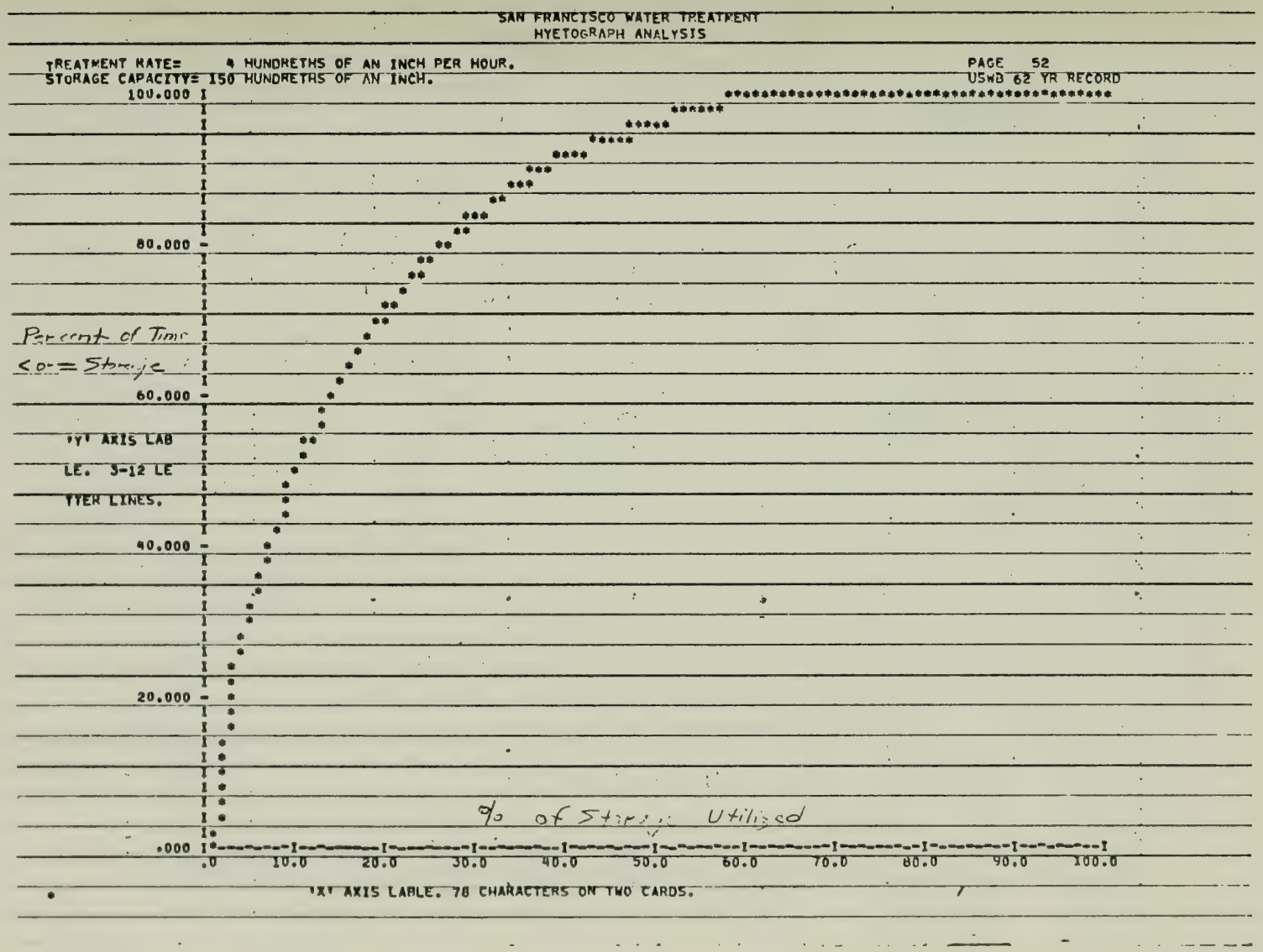
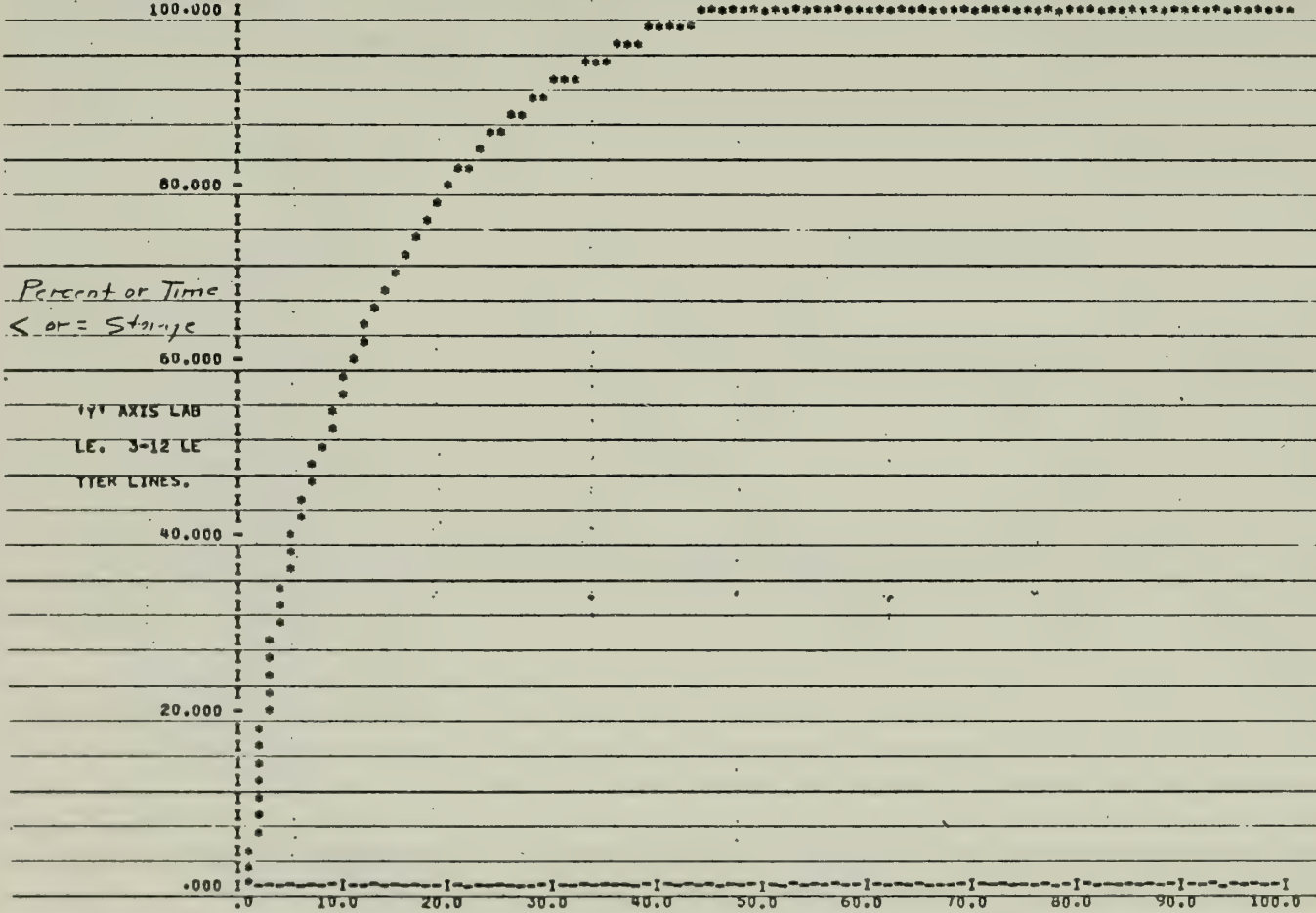

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
PAGE 52
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
<or= Storage
'Y' AXIS LAB
LE. 3-12 LE
TYER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 26

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.

PAGE 52
USWB 62 YR RECORD



'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

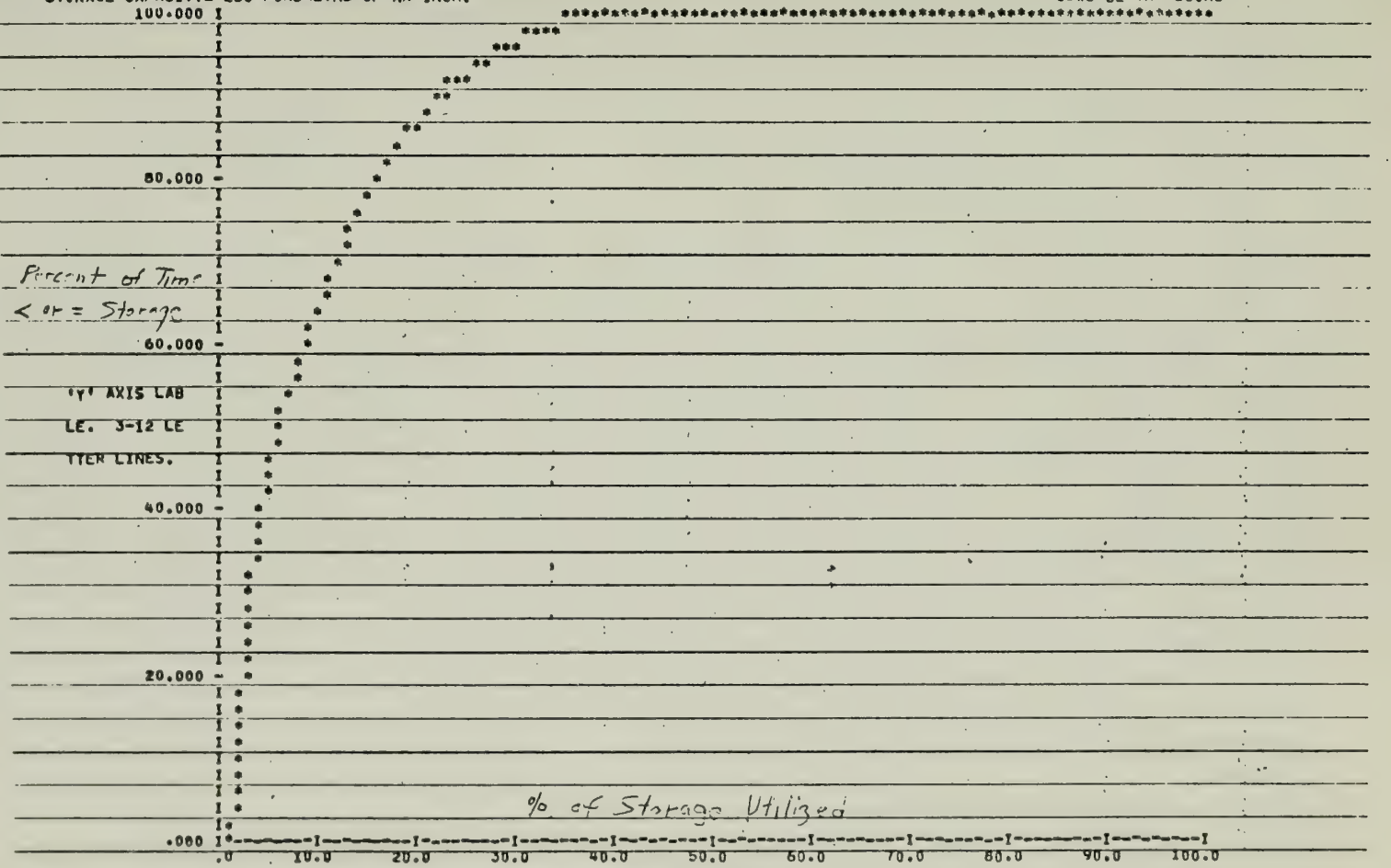
% of Total Volume

PLATE 27

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= & HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH.

PAGE 52
USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 28

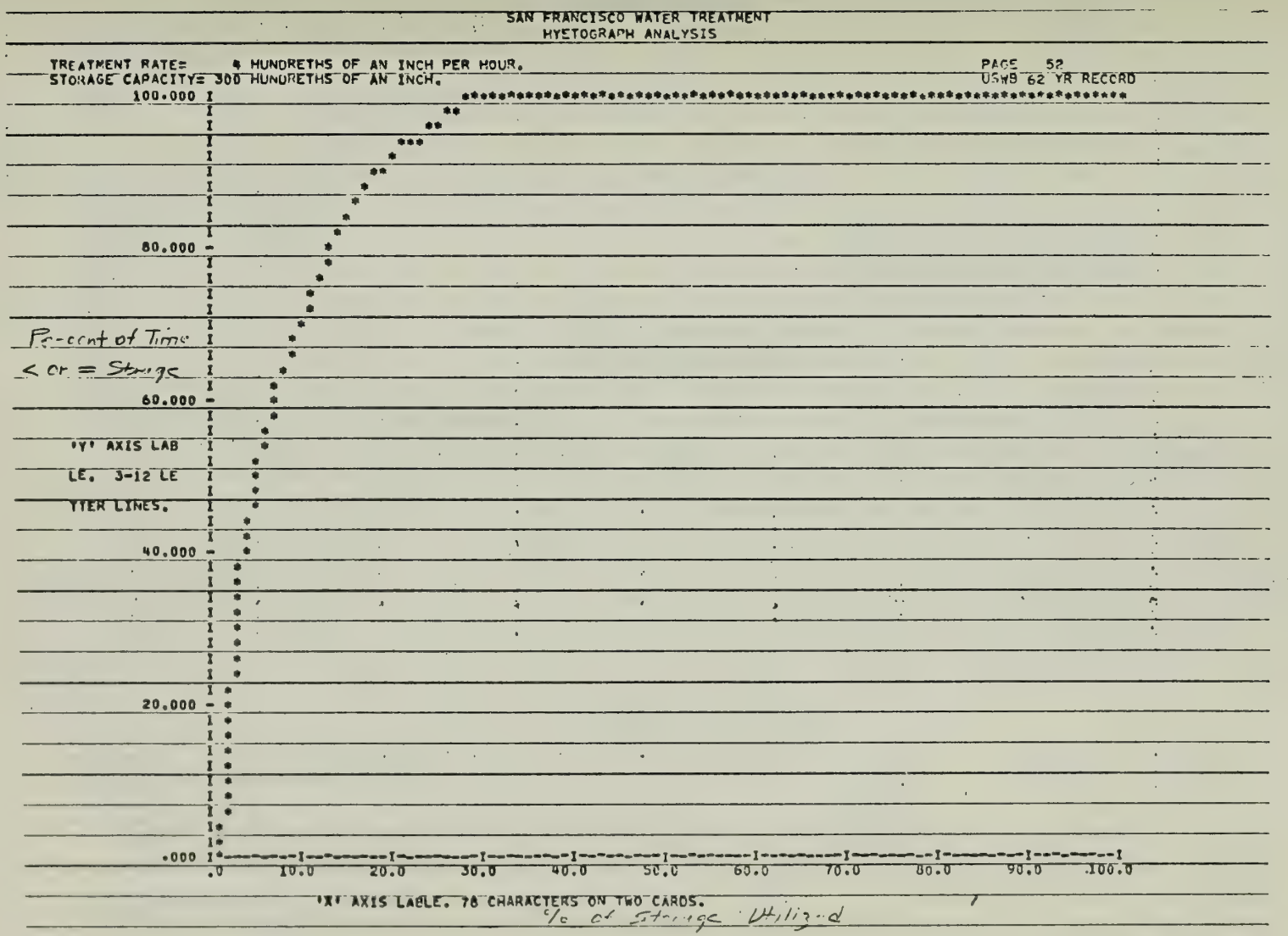

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
PAGE 52
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.
% of Storage Utilized

PLATE 29

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
RUN DATE 71139

PAGE 64
62YR SF FED BLDG

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	*4	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 3123 EVENTS		76.6**	2.0	2.0	27.0	0.0	2.0	0.0	0.0*						7.6	25.3	0.5	0.0	0.0	0.0	0.0
AVERAGE 3123 OVERFLOW EVENTS			2.0	2.0	27.0	0.0	2.0	0.0	1.0	2.0	15.0	12.1			7.6	25.3	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 50.371
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 50.371
AVERAGE ANNUAL OVERFLOW, IN INCHES = 7.569

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 48
USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	*4	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2342 EVENTS		98.8**	4.9	4.6	41.6	1.3	6.2	11.8	1.7*						11.7	46.9	.7	3.1	4.4	1.6	1.8
AVERAGE 578 OVERFLOW EVENTS			10.0	9.0	100.3	2.5	12.5	7.5*	3.5	3.2	28.0	20.5			17.8	84.3	1.9	6.9	10.4	3.3	3.9

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 37.774
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 9.323
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.611

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134

PAGE 48
62YR SF FED BLDG

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	*4	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2324 EVENTS		99.9**	5.1	4.7	42.0	1.4	6.4	12.9	1.8*						11.9	49.4	1.3	3.2	4.6	1.7	1.9
AVERAGE 472 OVERFLOW EVENTS			11.2	9.9	111.4	3.0	14.2	8.6*	4.0	3.3	26.8	20.5			19.5	94.6	2.7	7.9	12.1	3.7	4.4

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 37.484
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 7.613
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.194

PLATE 30

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 47
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	***10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2285 EVENTS			100.4**	5.4	4.8	42.9	1.6	7.015.7	2.2*					12.6	52.1	.9	3.5	5.2	1.8	2.1	
AVERAGE 226 OVERFLOW EVENTS			16.2	13.5	154.1	4.8	20.911.9*		6.2	3.6	31.1	21.6		26.1	134.8	3.7	11.4	18.8	5.4	6.6	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.855
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 3.645
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.134

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 47
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	***10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2261 EVENTS			100.7**	5.7	4.9	43.4	1.7	7.417.3	2.5*					12.9	54.3	1.0	3.7	5.6	1.8	2.2	
AVERAGE 93 OVERFLOW EVENTS			21.5	16.8	205.7	7.3	28.914.9*		7.8	4.1	34.9	21.2		34.2	183.1	5.5	15.8	26.9	7.4	9.1	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.468
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.500
AVERAGE ANNUAL OVERFLOW, IN INCHES = .524

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 47
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	***10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2253 EVENTS			100.9**	5.7	5.0	43.6	1.8	7.618.1	2.7*					13.1	55.2	1.0	3.8	5.7	1.9	2.2	
AVERAGE 41 OVERFLOW EVENTS			28.2	21.4	263.7	9.3	37.516.6*		10.3	4.7	40.8	22.4		42.5	233.9	7.2	19.9	35.8	9.7	12.2	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.339
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .661
AVERAGE ANNUAL OVERFLOW, IN INCHES = .270

PLATE 31

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 46
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE INTL	HOURS	TREATMENT QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2250 EVENTS				100.7**	5.8	5.0	43.7	1.8	7.6	18.6	2.8*					13.2	55.8	1.1	3.8	5.8	1.9	2.2
AVERAGE 11 OVERFLOW EVENTS				39.9	30.9	383.6	15.5	55.5	17.9	*	15.8	6.9	53.3	34.3	60.7	341.2	11.2	29.3	53.9	14.6	18.4	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.290
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .177
AVERAGE ANNUAL OVERFLOW, IN INCHES = .095

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 46
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE INTL	HOURS	TREATMENT QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 2249 EVENTS				100.8**	5.8	5.0	43.7	1.9	7.7	18.8	2.9*					13.2	56.0	1.1	3.9	5.9	1.9	2.3
AVERAGE 7 OVERFLOW EVENTS				37.1	30.7	401.9	27.7	64.9	18.2	*	23.3	3.6	15.3	13.1	69.0	396.3	15.1	34.7	61.8	16.1	20.9	

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

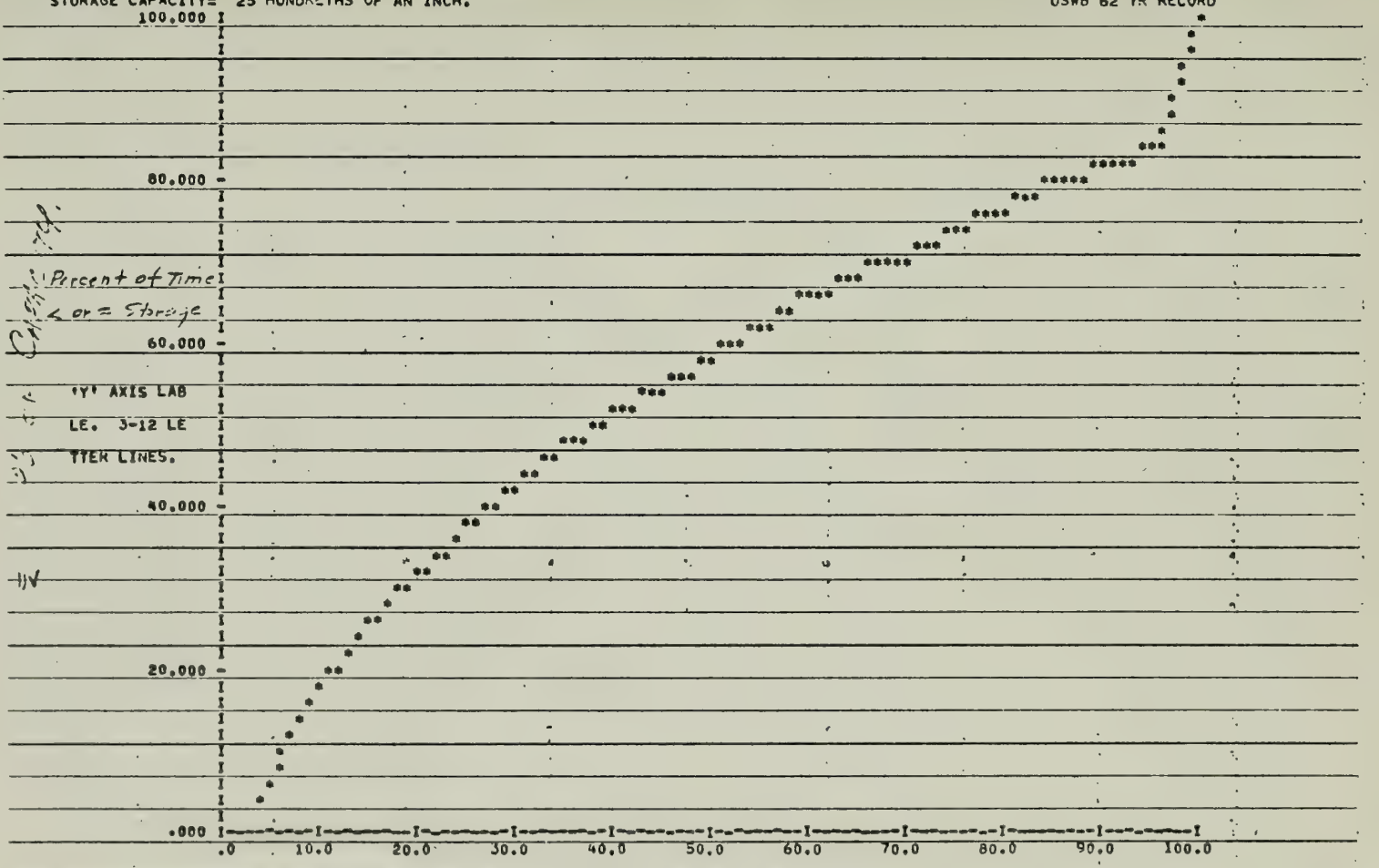
AVERAGE NUMBER OF EVENTS PER YEAR = 36.274
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .113
AVERAGE ANNUAL OVERFLOW, IN INCHES = .017

PLATE 32

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 50
USWB 62 YR RECORD



'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 33

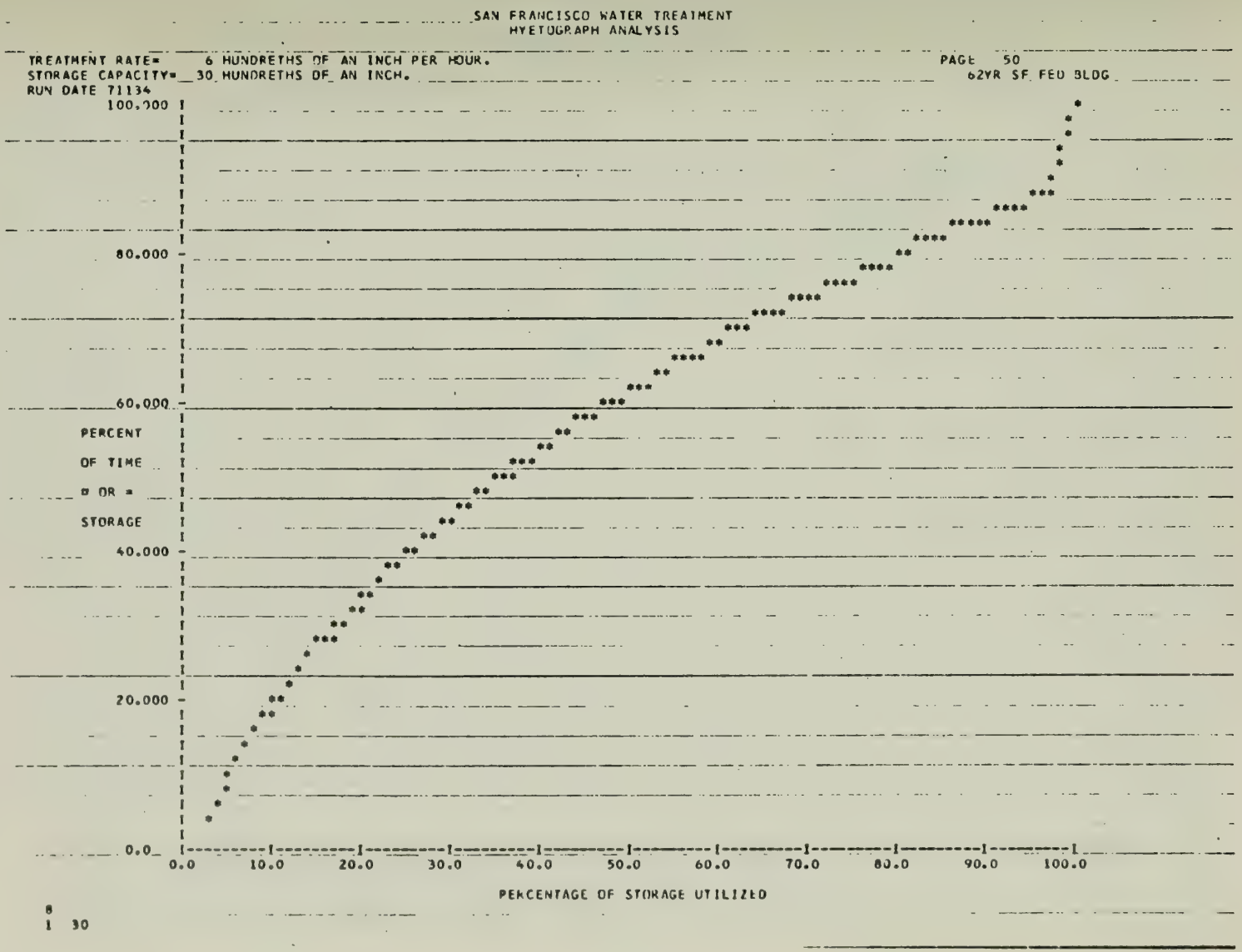

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134
PAGE 50
62YR SF FED BLDG
100.000
80.000
60.000
PERCENT
OF TIME
OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED
6
1 30

PLATE 34

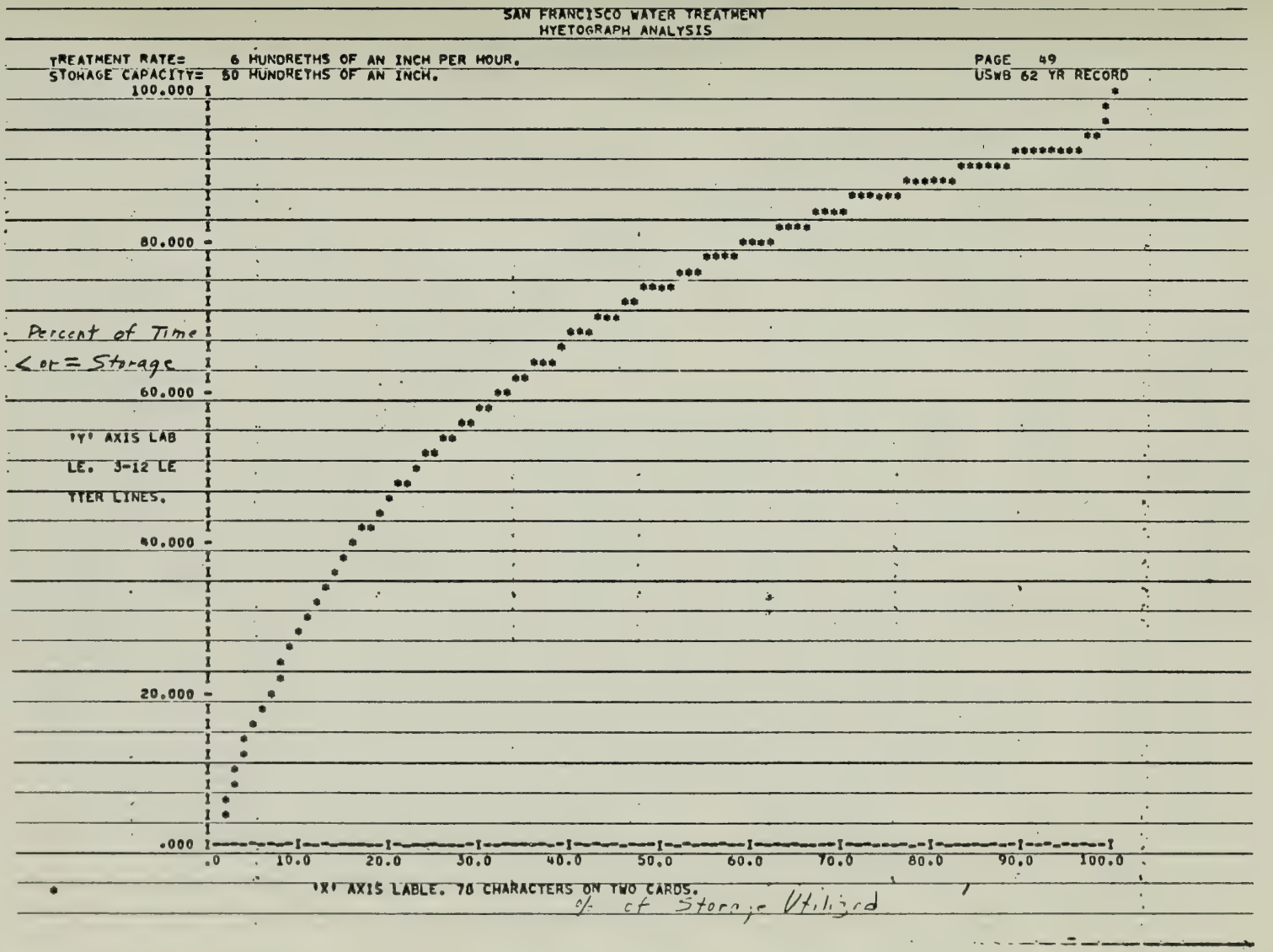
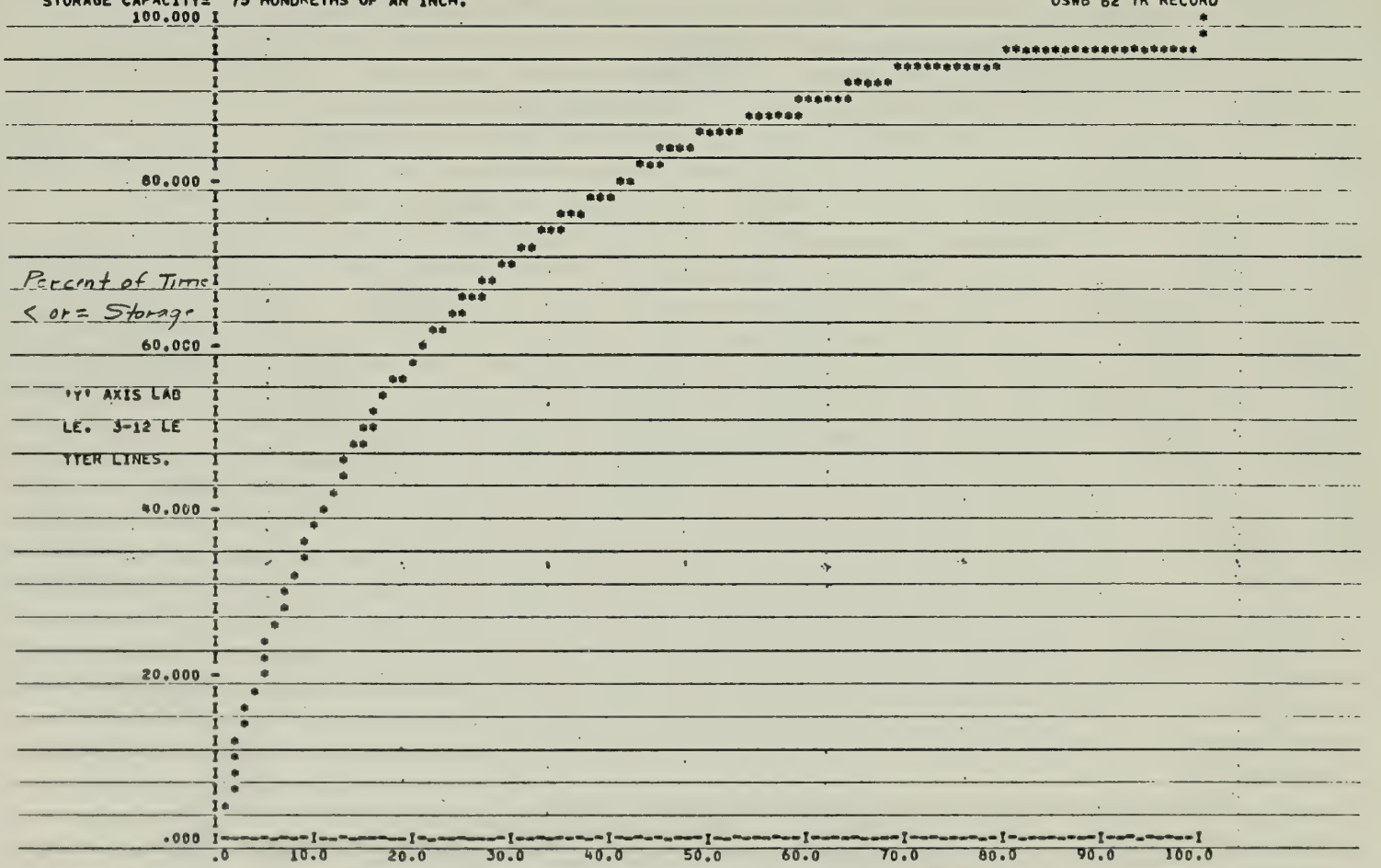

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 80 HUNDRETHS OF AN INCH.
PAGE 49
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
YTER LINES.
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.
% of Storage Utilized

PLATE 35

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.

PAGE 49
USWB 62 YR RECORD



Percent of Time
< or = Storage

'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.
% of Storage Utilized

PLATE 36

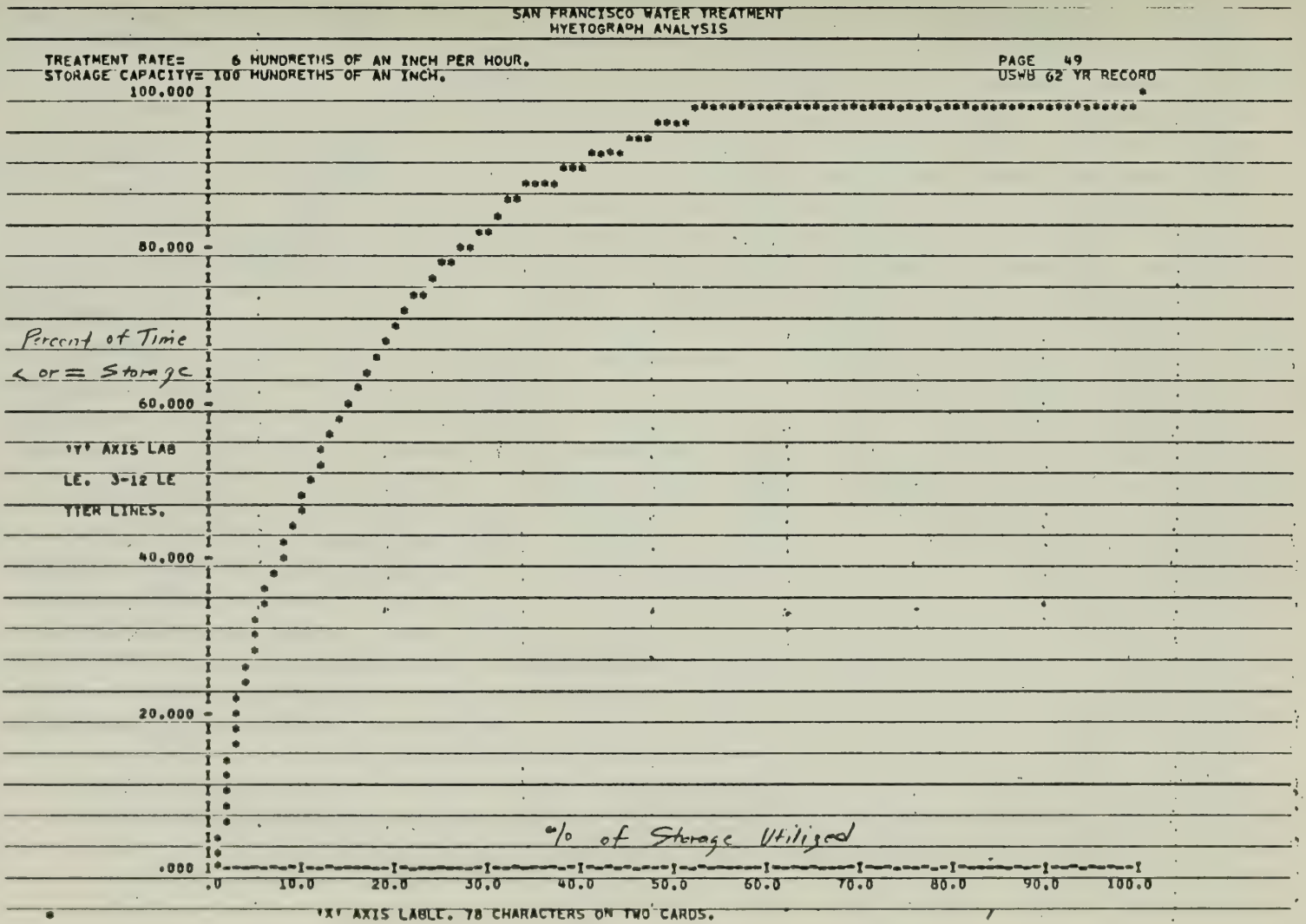

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
PAGE 49
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 37

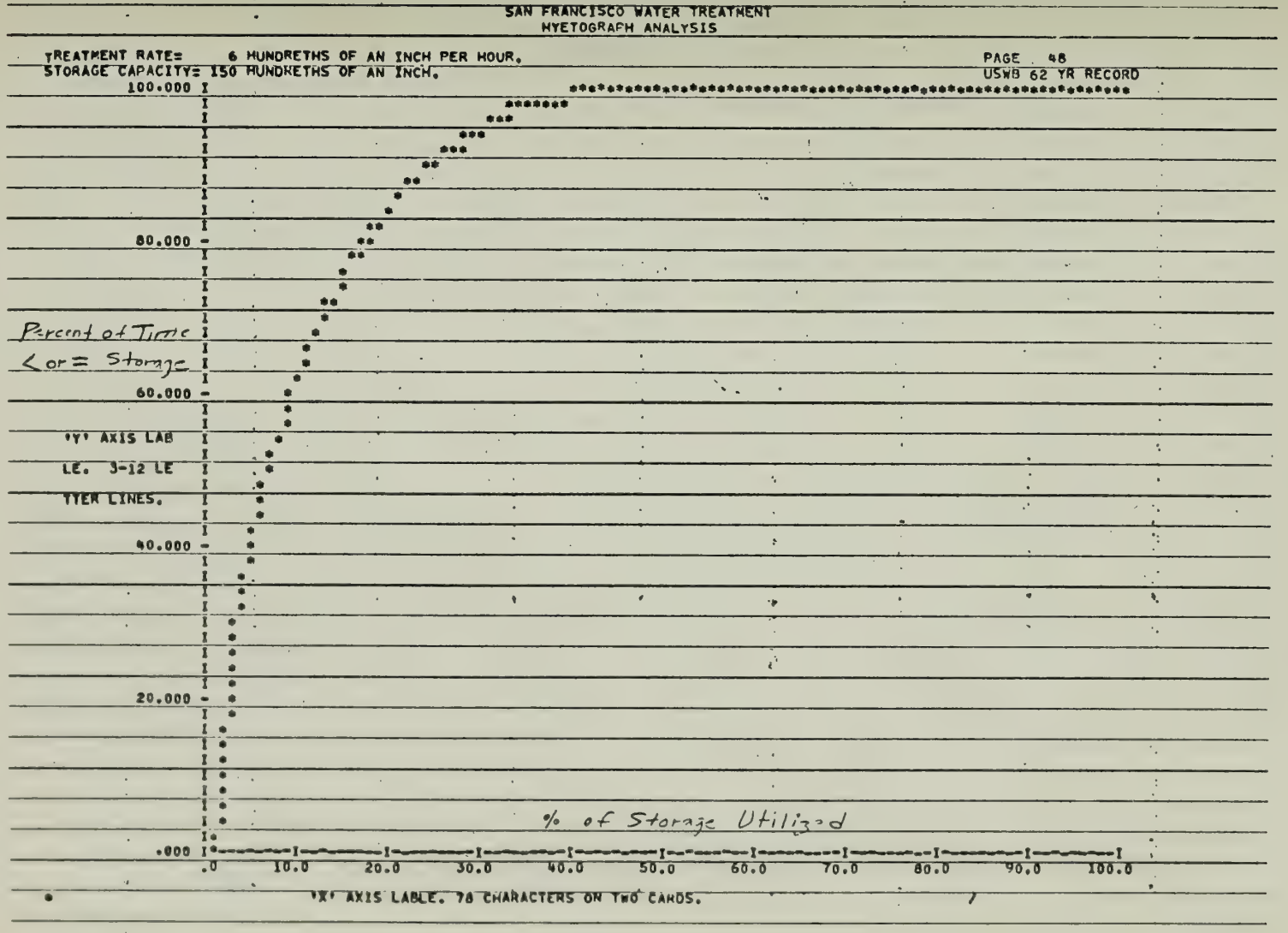

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
PAGE 48
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 38

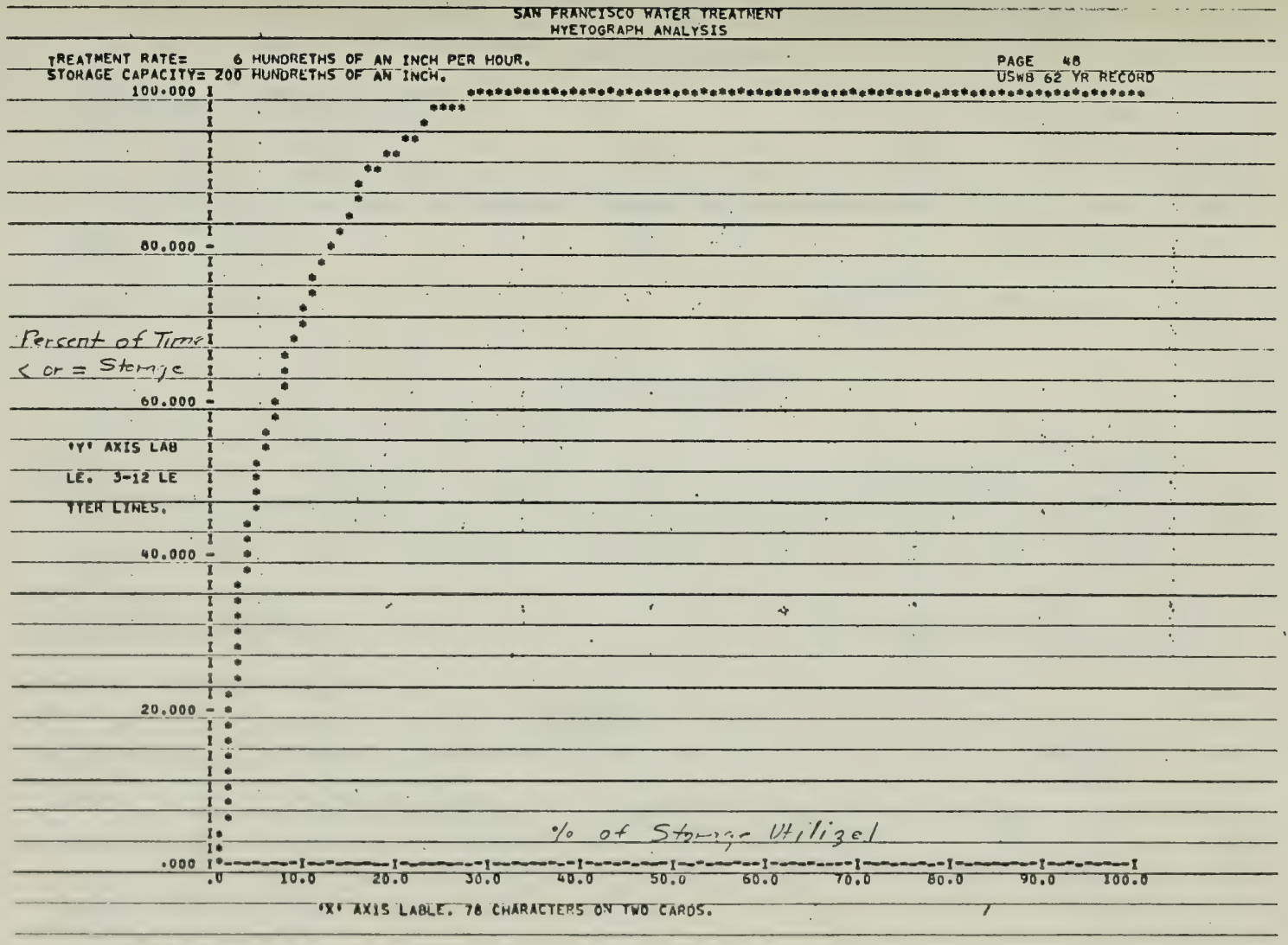

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
PAGE 48
USW8 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 39

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 51
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71139

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	*4	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2475 EVENTS			65.5**	1.8	1.8	28.8	C.0	1.8	C.0	0.0*						9.5	36.6	C.5	C.C	C.0	C.C	C.0
AVERAGE 2479 OVERFLOW EVENTS				1.8	1.8	28.8	C.0	1.8	0.0*	1.0	1.8	14.3	12.3			9.5	36.6	C.5	C.C	C.0	0.C	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 39.984
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 39.984

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 42
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	********5	*****6	****7	*****8	*****9	**10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 2047 EVENTS			106.4**	3.8	3.8	41.0	.5	4.3	6.8	1.3*						12.1	51.7	.2	2.1	2.5	1.2	1.2
AVERAGE 945 OVERFLOW EVENTS				5.5	6.4	67.1	.7	6.2	4.1*	1.9	2.5	21.3	17.2			13.6	65.4	.4	3.3	4.2	1.7	1.9

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 33.016
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 15.242

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 41
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	********5	*****6	****7	*****8	*****9	**10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1981 EVENTS			109.2**	4.3	4.2	43.0	.8	5.2	11.6	1.6*						12.9	58.3	.4	2.5	3.4	1.3	1.5
AVERAGE 446 OVERFLOW EVENTS				8.4	7.9	100.9	1.8	10.2	7.7*	3.1	2.7	23.5	18.3			16.9	95.5	1.3	5.6	8.1	2.7	3.1

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.952
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 7.194
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.694

PLATE 40

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 41
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71134

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5		*6	*7	*8		*9	*10	*11	*12	13 *14	**15	**16	***17	***18	**19	**20	**21	**22	**23
AVERAGE 1971 EVENTS			110.2**	4.4	4.2	43.3	0.9	5.3	12.6	1.7*						13.1	59.6	1.0	2.5	3.5	1.4	1.5
AVERAGE 355 OVERFLOW EVENTS			9.2	8.6	110.9	2.0	11.3	8.7*	3.5	2.7	24.1	18.8		18.2	105.2	2.1	6.3	9.2	3.0	3.5

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.790
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 5.726
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.377

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 40
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5		*6	*7	*8		*9	*10	*11	*12	13 *14	**15	**16	***17	***18	**19	**20	**21	**22	**23
AVERAGE 1948 EVENTS			110.7**	4.7	4.3	44.1	1.0	5.7	14.9	2.0*						13.5	62.7	.6	2.7	3.9	1.4	1.6
AVERAGE 147 OVERFLOW EVENTS			13.2	11.6	155.0	3.3	16.5	12.1*	4.9	3.0	26.7	20.3		23.0	146.0	2.7	9.1	14.5	4.4	5.2

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.819
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.371
AVERAGE ANNUAL OVERFLOW, IN INCHES = .633

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 40
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5		*6	*7	*8		*9	*10	*11	*12	13 *14	**15	**16	***17	***18	**19	**20	**21	**22	**23
AVERAGE 1939 EVENTS			111.0**	4.8	4.4	44.4	1.1	5.9	16.1	2.2*						13.7	64.2	.6	2.8	4.1	1.5	1.7
AVERAGE 56 OVERFLOW EVENTS			17.8	15.1	209.4	5.4	23.0	14.4*	7.3	3.4	29.2	19.6		30.9	200.4	4.1	12.6	20.7	6.0	7.3

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.274
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .903
AVERAGE ANNUAL OVERFLOW, IN INCHES = .264

PLATE 41

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 40
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 1934 EVENTS				111.0**	4.8	4.4	44.5	1.1	5.9	16.5	2.3*					13.8	64.8	.6	2.8	4.2	1.5	1.7
AVERAGE 23 OVERFLOW EVENTS				24.8	20.9	282.7	7.0	31.8	15.5*	10.9	3.9	32.6	25.8			39.3	269.3	5.4	16.5	29.8	8.0	9.8

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.194
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .371
AVERAGE ANNUAL OVERFLOW, IN INCHES = .121

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 40
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 1931 EVENTS				111.2**	4.8	4.4	44.6	1.2	6.0	16.9	2.4*					13.8	65.2	.7	2.9	4.2	1.5	1.7
AVERAGE 7 OVERFLOW EVENTS				32.3	26.4	358.4	10.3	42.6	16.4*	14.7	4.0	21.7	18.9			50.0	355.4	7.7	22.5	40.7	10.7	13.5

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.145
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .113
AVERAGE ANNUAL OVERFLOW, IN INCHES = .025

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 40
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	*15	*16	*17	*18	*19	*20	*21	*22	*23
AVERAGE 1931 EVENTS				111.2**	4.8	4.4	44.6	1.2	6.0	16.9	2.4*					13.8	65.3	.7	2.9	4.2	1.5	1.7
AVERAGE 1 OVERFLOW EVENTS				31.0	25.0	402.0	19.0	80.0	16.8*	8.0	2.0	4.0	4.0			55.0	411.0	10.0	21.8	48.5	13.0	17.0

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 27 DRY PERIODS.

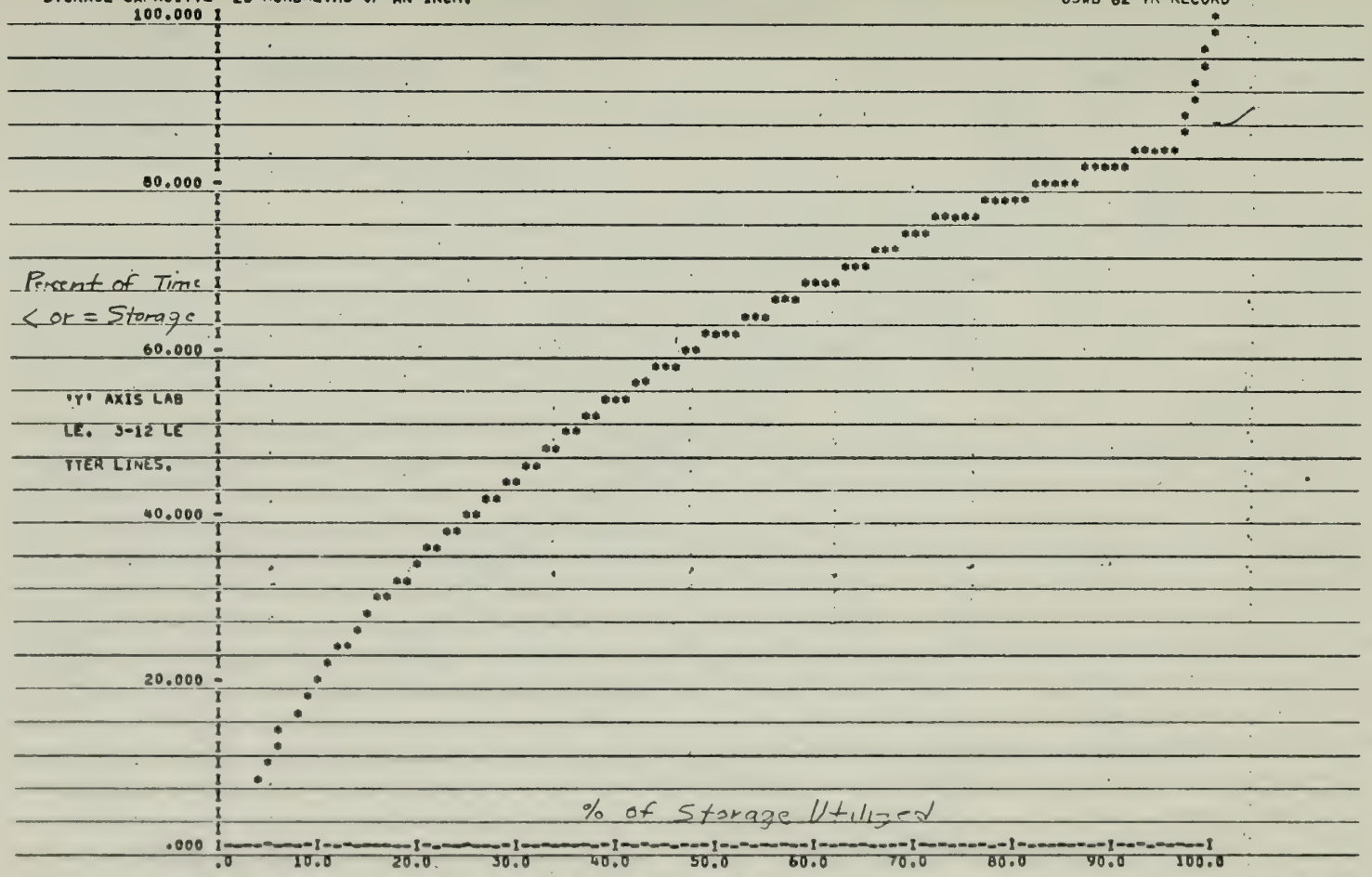
AVERAGE NUMBER OF EVENTS PER YEAR = 31.145
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .016
AVERAGE ANNUAL OVERFLOW, IN INCHES = .001

PLATE 42

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 43
USWB 62 YR RECORD



'Y' AXIS LABLE. 5-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 43

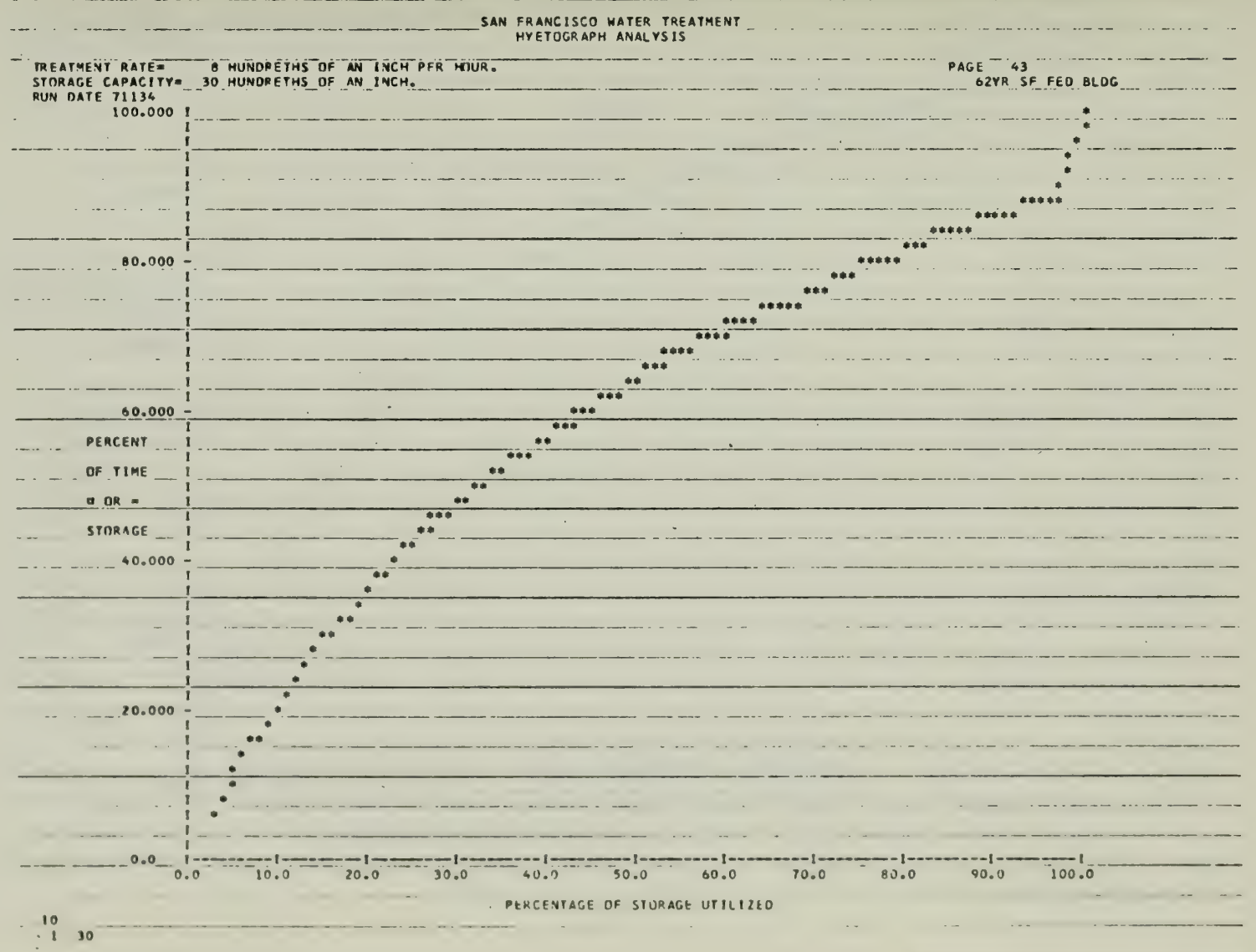

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134
PAGE 43
62YR SF FED BLDG
100.000
80.000
60.000
PERCENT
OF TIME
Q OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED
10
1 30

PLATE 44

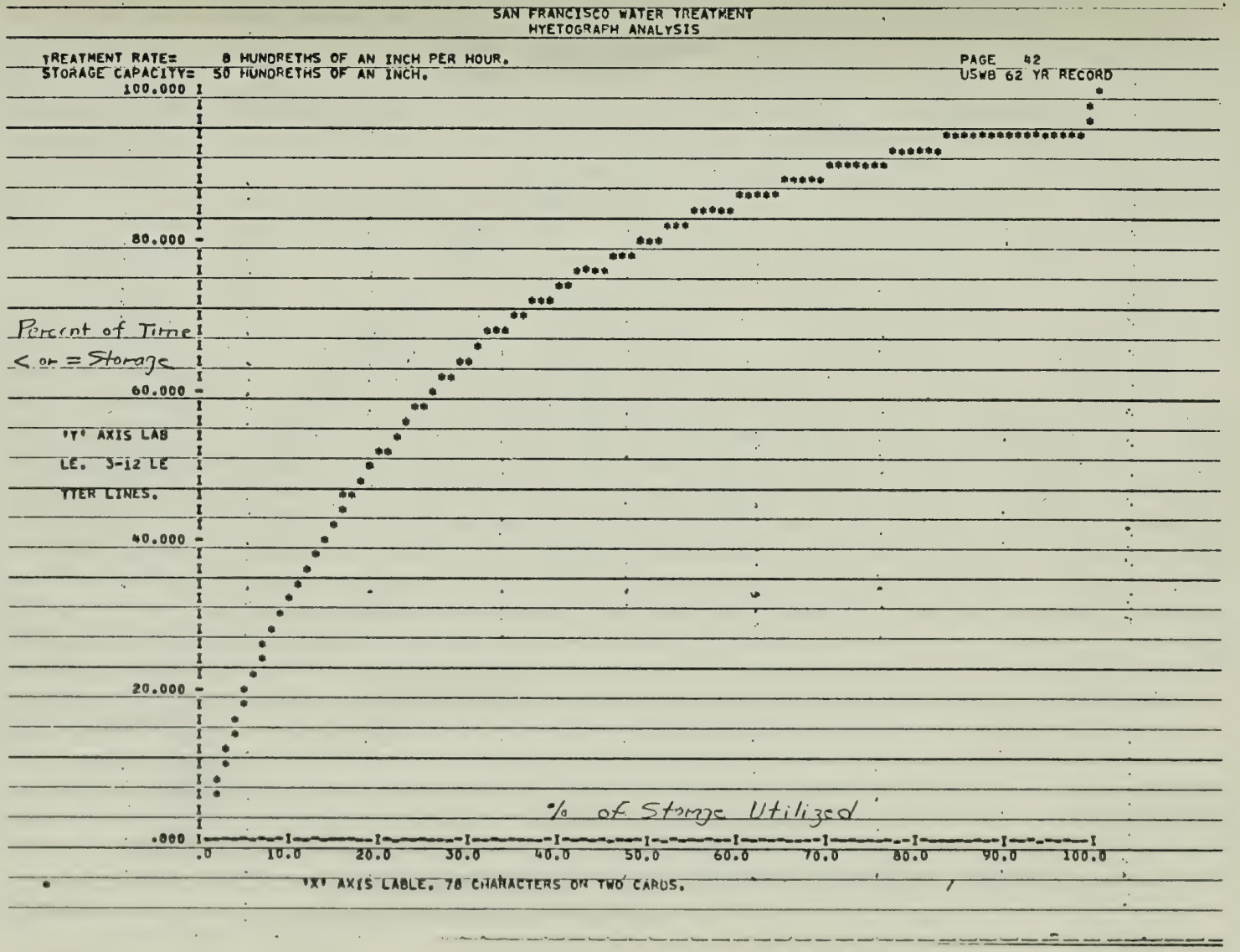

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
PAGE 42
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 45

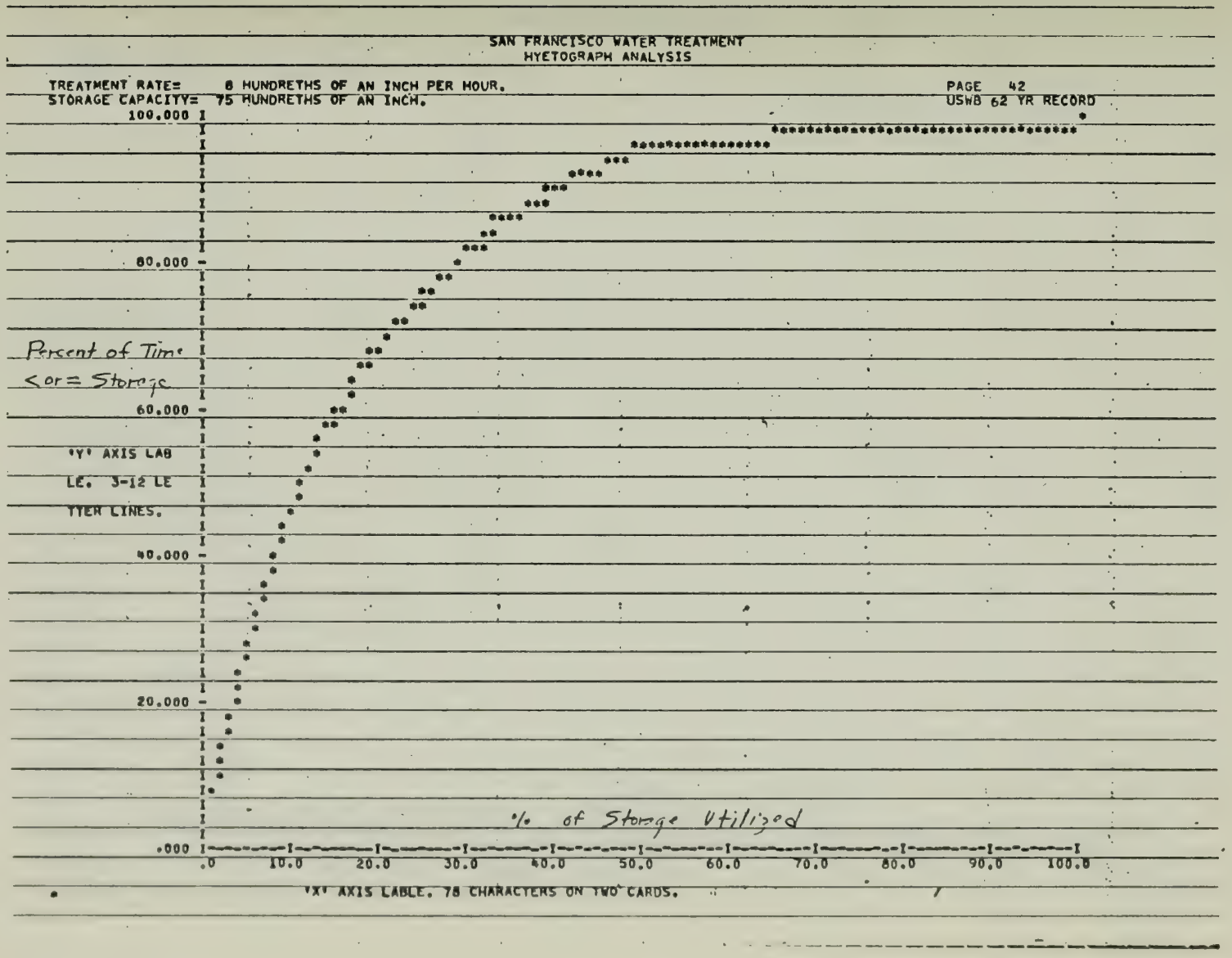
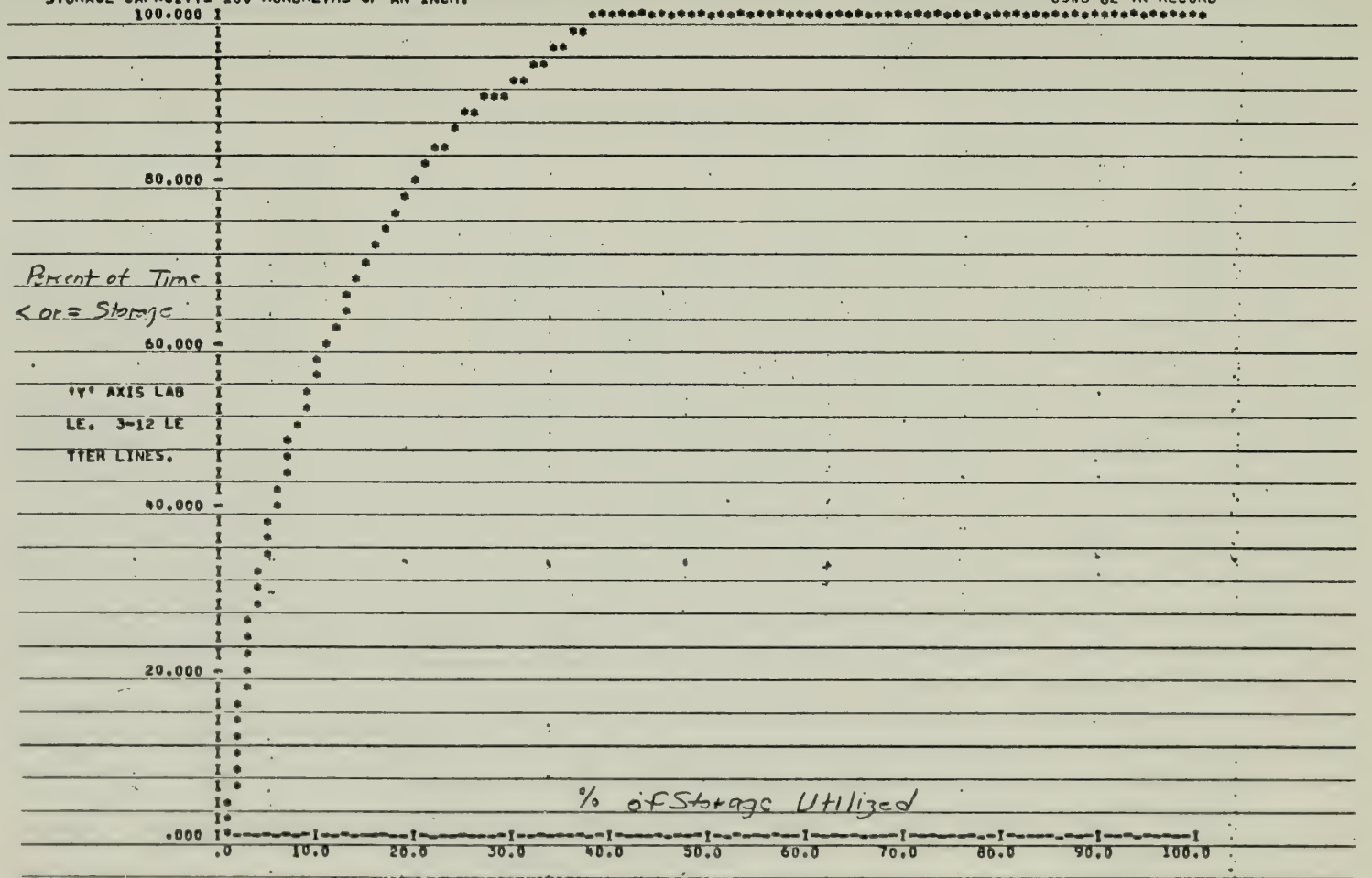

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
PAGE 42
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
<or= Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 46

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 42
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 47

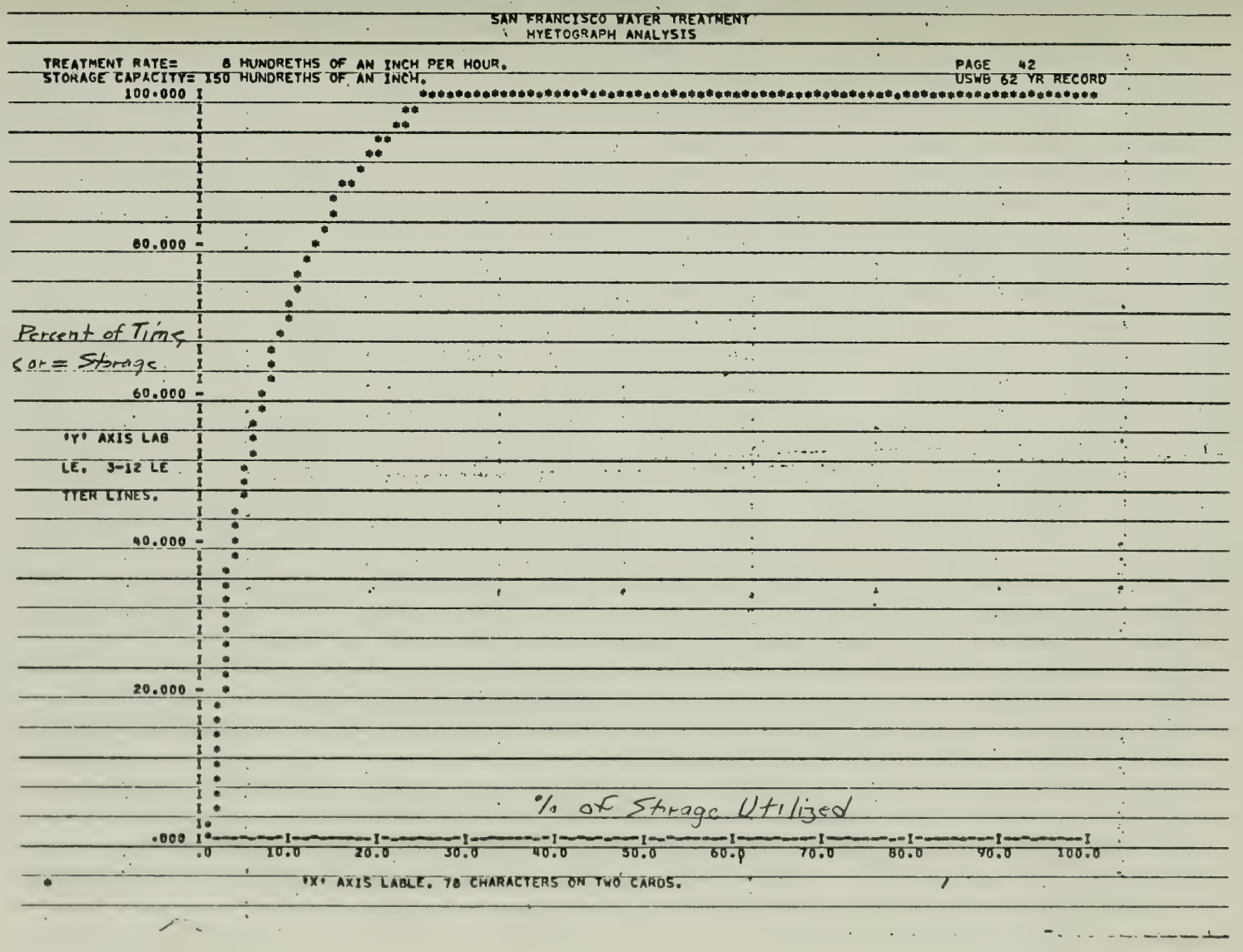
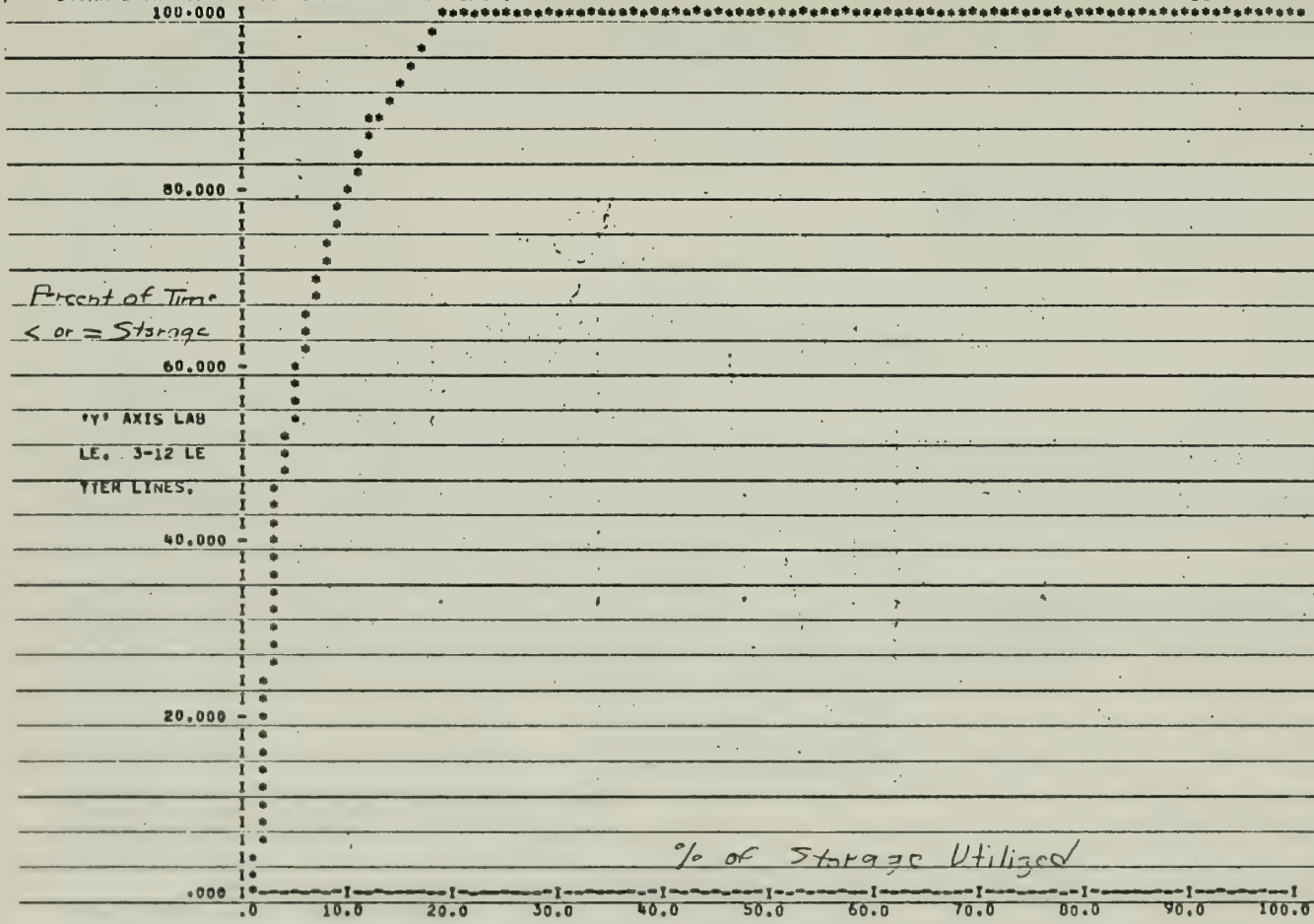

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
PAGE 42
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Strage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 48

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR. PAGE 42
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. USWB 62 YR RECORD



'Y' AXIS LABLE. 3-12 LETTER LINES.

'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 49

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 42
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71139

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 2002 EVENTS			102.1**	1.6	1.6	30.0	0.0	1.6	0.0	0.0*						11.8	49.4	0.5	0.0	0.0	0.0	0.0
AVERAGE 2002 OVERFLOW EVENTS				1.6	1.6	30.0	0.0	1.6	0.0*	1.0	1.6	13.5	12.3			11.8	49.4	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.290
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 32.290
AVERAGE ANNUAL OVERFLOW, IN INCHES = 4.363

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 36
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 1704 EVENTS			118.9**	3.4	3.4	42.4	.4	3.8	6.7	1.2*						14.3	65.4	.1	1.7	2.0	1.0	1.1
AVERAGE 774 OVERFLOW EVENTS				4.7	4.7	67.2	.5	5.3	4.0*	1.8	2.2	18.9	16.2			15.4	78.9	.2	2.7	3.3	1.5	1.5

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 27.484
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 12.484
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.363

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 35
STORAGE CAPACITY= 17 HUNDRETHS OF AN INCH. 62 YR SF FED BLDG
RUN DATE 71195

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 1680 EVENTS			119.7**	3.7	3.6	43.5	0.5	4.2	9.3	1.4*						14.6	68.9	0.0	0.0	0.0	0.0	0.0
AVERAGE 518 OVERFLOW EVENTS				5.9	5.8	83.4	0.8	6.7	5.9*	2.3	2.2	19.8	16.8			16.6	93.8	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 27.097
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 8.355
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.694

= 9.1

PLATE 50

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 35
USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 1665 EVENTS				120.7**	3.9	3.8	44.2	.6	4.4	11.3	1.5*				14.9	71.5	.3	2.0	2.6	1.1	1.2	
AVERAGE 335 OVERFLOW EVENTS				7.2	6.9	101.3	1.3	8.5	7.9*	2.8	2.3	20.7	17.4	18.5	111.1	1.0	4.6	6.4	2.3	2.6		

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.855
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 5.403
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.121

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 29 HUNDRETHS OF AN INCH.
RUN DATE 71195

PAGE 35
62 YR SF FED BLDG

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 1659 EVENTS				121.0**	3.9	3.8	44.4	0.6	4.5	12.0	1.6*				15.0	72.5	0.0	0.0	0.0	0.0	0.0	
AVERAGE 274 OVERFLOW EVENTS				7.9	7.5	110.2	1.5	9.4	8.6*	3.1	2.3	21.0	17.7	19.9	121.3	0.0	0.0	0.0	0.0	0.0		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.758
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 4.419
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.930

51

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDRETHS OF AN INCH.
RUN DATE 71134

PAGE 35
62YR SF FED BLDG

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 1659 EVENTS				121.0**	3.9	3.8	44.4	0.6	4.5	12.1	1.6*				15.0	72.7	0.9	2.1	2.7	1.2	1.3	
AVERAGE 260 OVERFLOW EVENTS				8.0	7.6	112.2	1.6	9.6	8.8*	3.2	2.3	21.2	17.8	20.3	123.9	1.7	5.3	7.5	2.6	2.9		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.758
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 4.194
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.887

PLATE 51

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	****3	*4	****5	****6	****7	****8	****9	**10	*11	*12	13	*14	**15	**16	**17	****18	**19	**20	**21	**22	**23
AVERAGE 1642 EVENTS				122.0**	4.1	3.9	45.1	.7	4.814.1		1.8*					15.3	75.4	.4	2.2	3.0	1.2	1.3
AVERAGE 99 OVERFLOW EVENTS				11.4	10.4	159.0		2.6	14.011.8*		4.2	2.7	23.1	18.5	25.1	169.4	2.2	7.8	11.8	3.6	4.3

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.484
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.597
AVERAGE ANNUAL OVERFLOW, IN INCHES = .369

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 60 HUNDRETHS OF AN INCH. 62 YR SF FED BLDG
RUN DATE 71195

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	****3	*4	****5	****6	****7	****8	****9	**10	*11	*12	13	*14	**15	**16	**17	****18	**19	**20	**21	**22	**23
AVERAGE 1640 EVENTS				122.4**	4.1	3.9	45.2	0.8	4.914.6		1.9*					15.4	76.0	0.0	0.0	0.0	0.0	0.0
AVERAGE 69 OVERFLOW EVENTS				13.0	11.8	179.0		3.1	16.212.6*		5.4	2.6	21.3	17.2	27.6	191.3	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.452
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.113
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.238 - 13 M4

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	****3	*4	****5	****6	****7	****8	****9	**10	*11	*12	13	*14	**15	**16	**17	****18	**19	**20	**21	**22	**23
AVERAGE 1639 EVENTS				122.3**	4.1	3.9	45.3	.8	4.915.0		1.9*					15.4	76.4	.4	2.3	3.1	1.2	1.4
AVERAGE 36 OVERFLOW EVENTS				15.4	13.7	209.6		3.8	19.213.7*		6.7	2.6	22.1	18.8	33.3	229.3	3.2	10.8	17.0	5.1	6.1

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.435
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .581
AVERAGE ANNUAL OVERFLOW, IN INCHES = .128

PLATE 52

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL	HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	AGE3	AGE4	--AGE OF STORAGE--- AGE5
AVERAGE 1637 EVENTS				122.4**	4.2	3.9	45.3	.8	4.9	15.3	2.0*				15.5	76.8	.4	2.3	3.1	1.2	1.4
AVERAGE 11 OVERFLOW EVENTS				22.4	19.5	290.5	4.5	26.8	14.8*	9.5	3.5	28.0	23.5	40.1	300.0	4.5	14.9	24.2	7.1	8.5

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.403
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .177
AVERAGE ANNUAL OVERFLOW, IN INCHES = .050

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 125 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO ST	DURATN	EXCESS	HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	AGE3	AGE4	--AGE OF STORAGE--- AGE5
AVERAGE 1626 EVENTS				150.6	4.2	4.0	45.4	.8	5.0	15.4					15.5	77.0	.4	1.3	1.6	1.2	1.4
AVERAGE 3 OVERFLOW EVENTS				28.6	24.6	361.0	5.4	34.2	15.1*	12.0	4.0	23.4	51.4	391.6	5.4	9.0	11.7	8.6	10.0

*NON-OVERFLOW EVENTS ONLY.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.387
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .081

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 34
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. USWB 62 YR RECORD

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL	HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	AGE3	AGE4	--AGE OF STORAGE--- AGE5
AVERAGE 1636 EVENTS				122.4**	4.2	4.0	45.4	.8	5.0	15.5	2.1*				15.5	77.0	.4	2.3	3.2	1.2	1.4
AVERAGE 2 OVERFLOW EVENTS				25.0	21.0	365.0	9.5	34.5	15.3*	9.5	2.0	23.0	23.0	57.0	414.5	5.5	16.9	32.2	8.2	10.2

* NON-OVERFLOW ENENTS ONLY.
**EXCLUDING 25 DRY PERIODS.

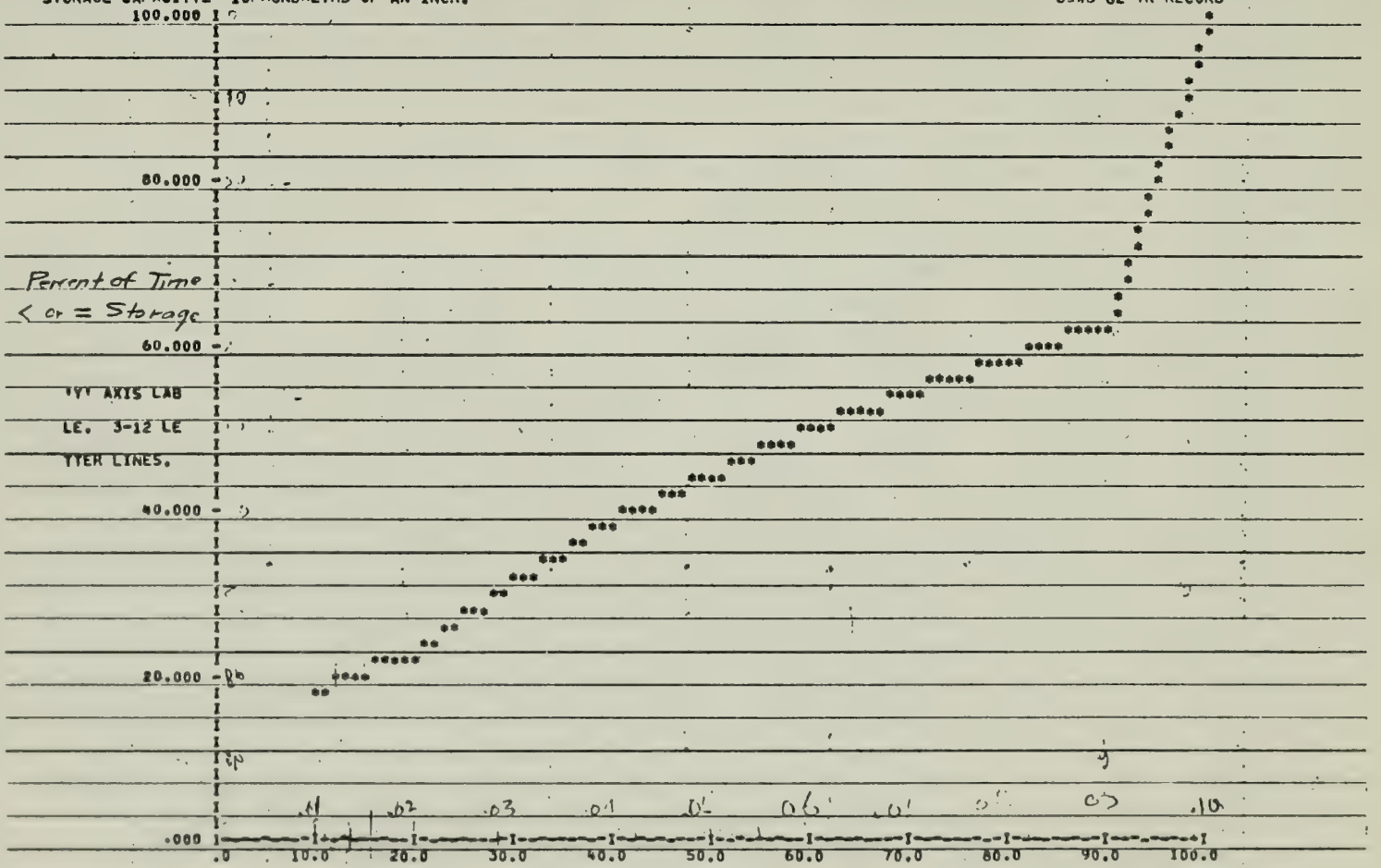
AVERAGE NUMBER OF EVENTS PER YEAR = 26.387
AVERAGE NUMBER OF OVERFLOWS PER YEAR = .032
AVERAGE ANNUAL OVERFLOW, IN INCHES = .007

PLATE 54

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.

PAGE 38
USWB 62 YR RECORD



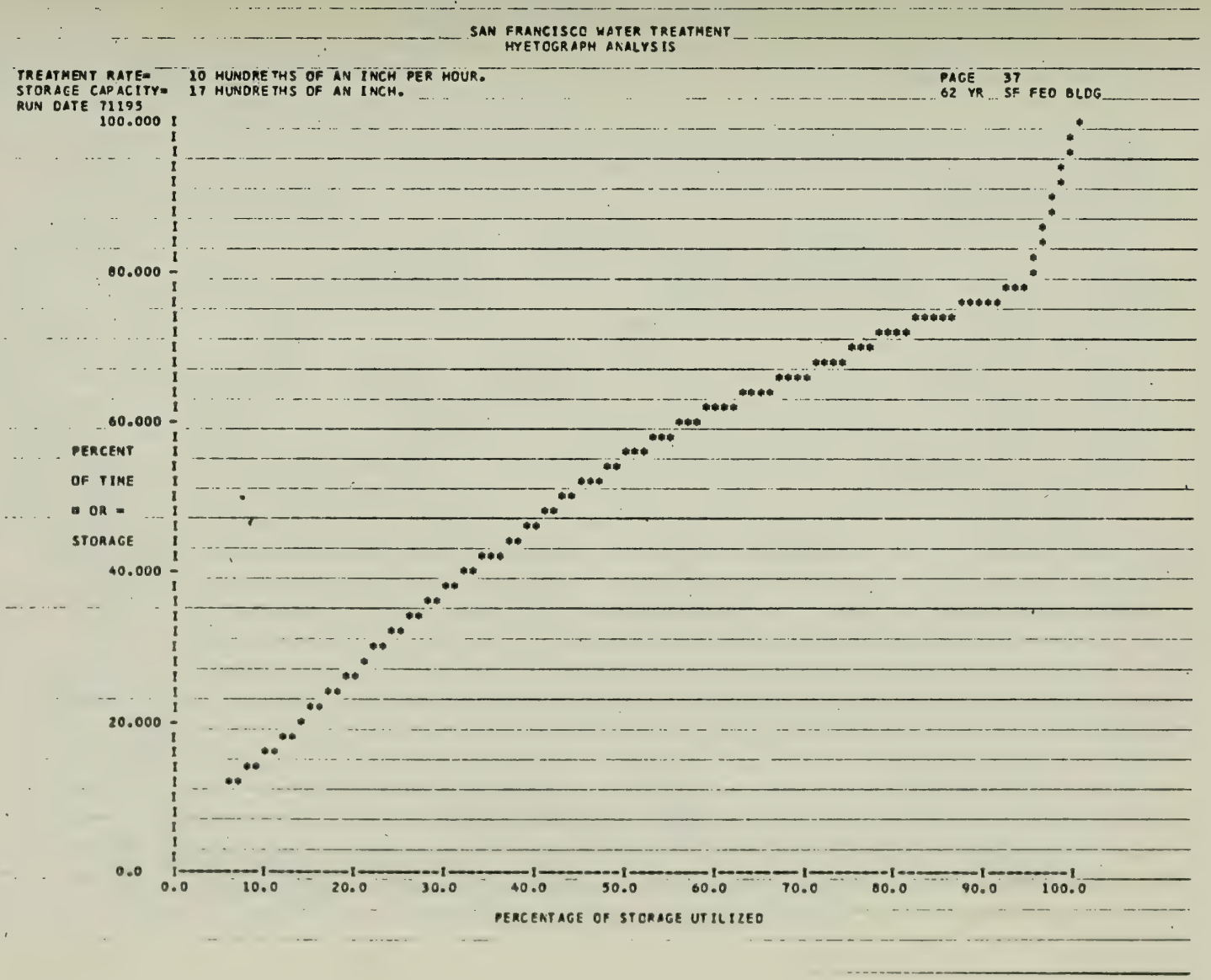

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 17 HUNDRETHS OF AN INCH.
RUN DATE 71195
PAGE 37
62 YR SF FED BLDG
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 55

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.

PAGE 37
USWB 62 YR RECORD

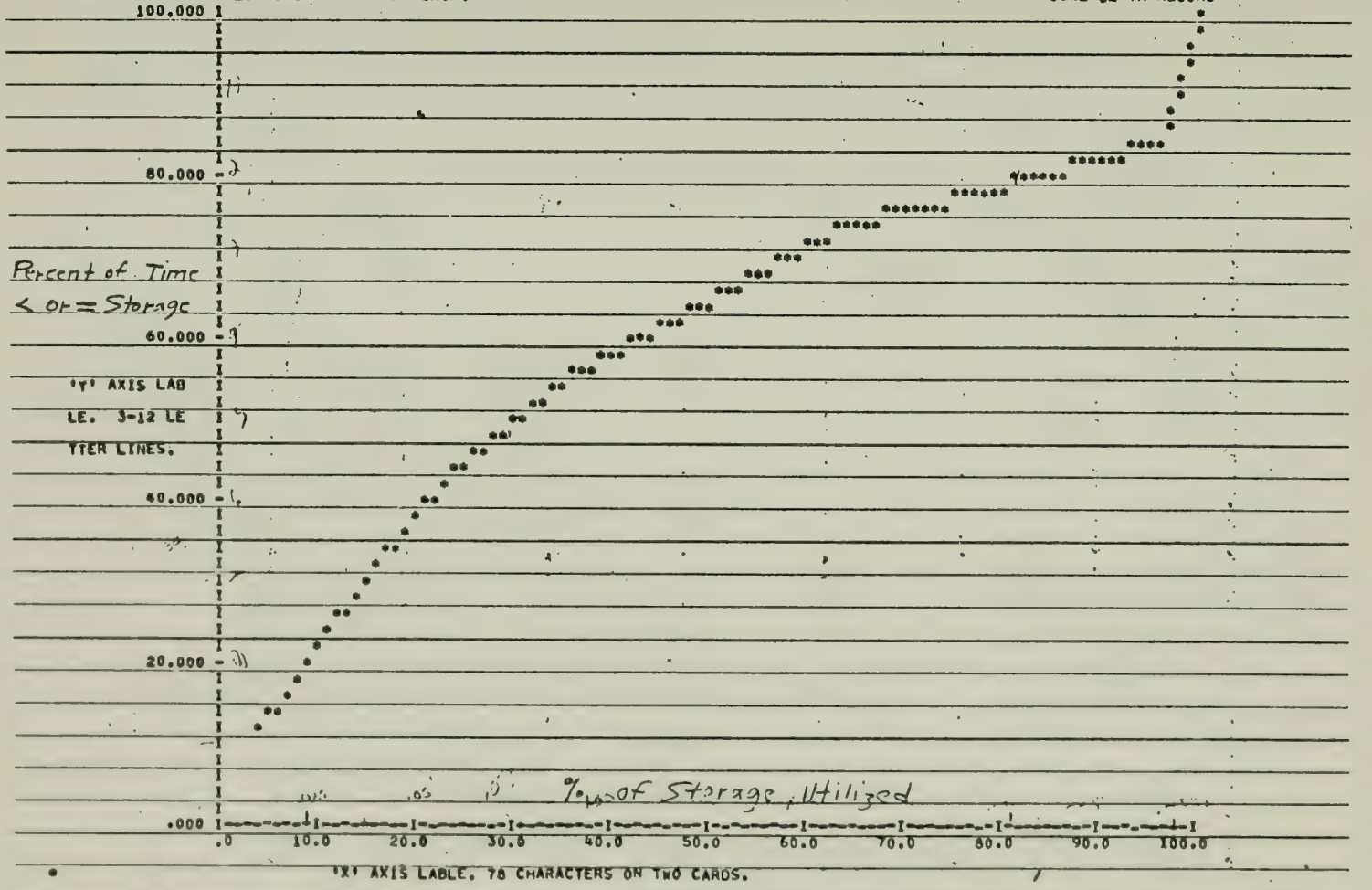


PLATE 56

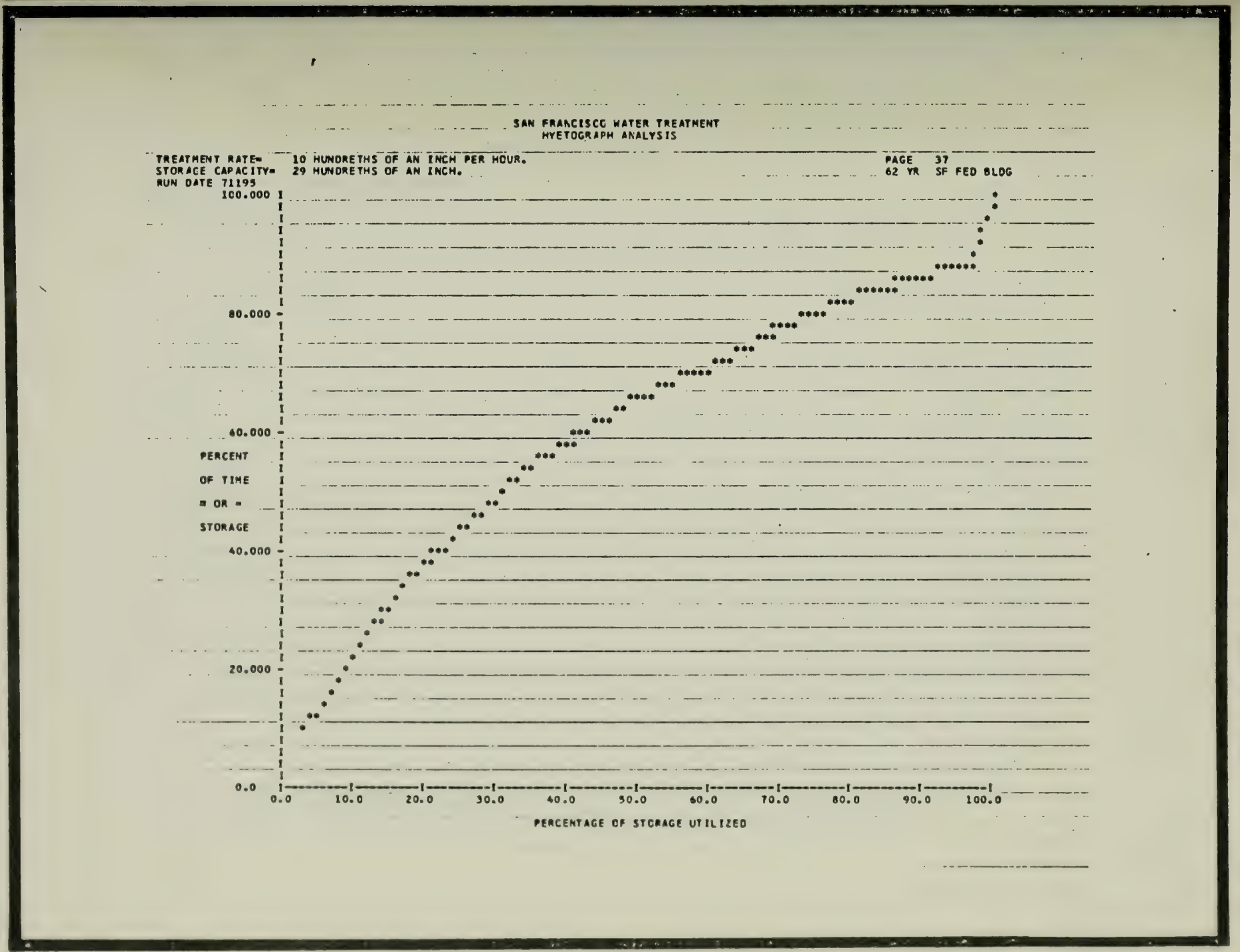

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 29 HUNDRETHS OF AN INCH.
RUN DATE 71195
PAGE 37
62 YR SF FED BLDG
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 57

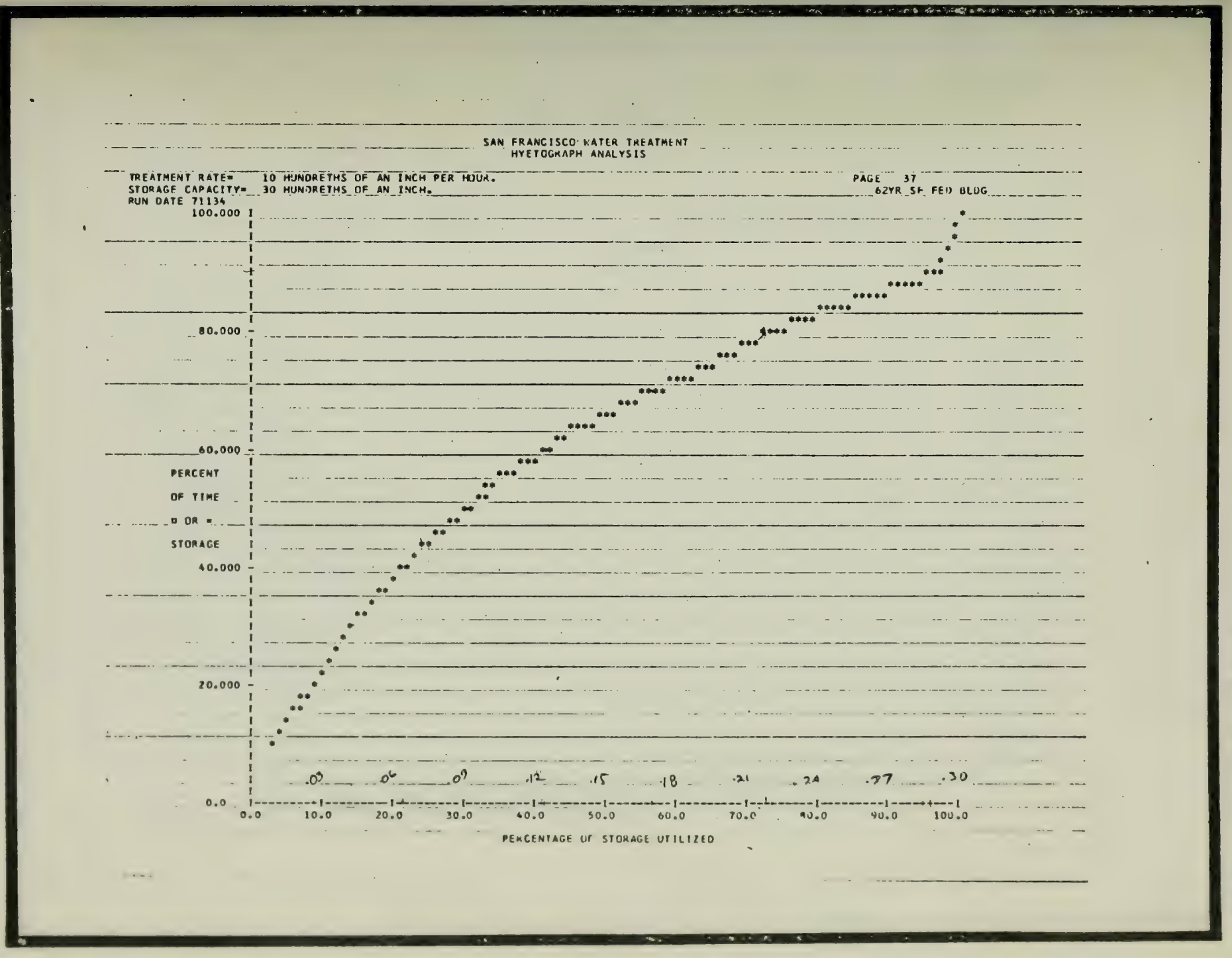

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDREDTHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 30 HUNDREDTHS OF AN INCH.
RUN DATE 71134
PAGE 37
62YR SF FED BLDG
100.000
80.000
60.000
PERCENT
OF TIME
□ OR =
STORAGE
40.000
20.000
0.0
.03 .06 .09 .12 .15 .18 .21 .24 .27 .30
0.0 10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 58

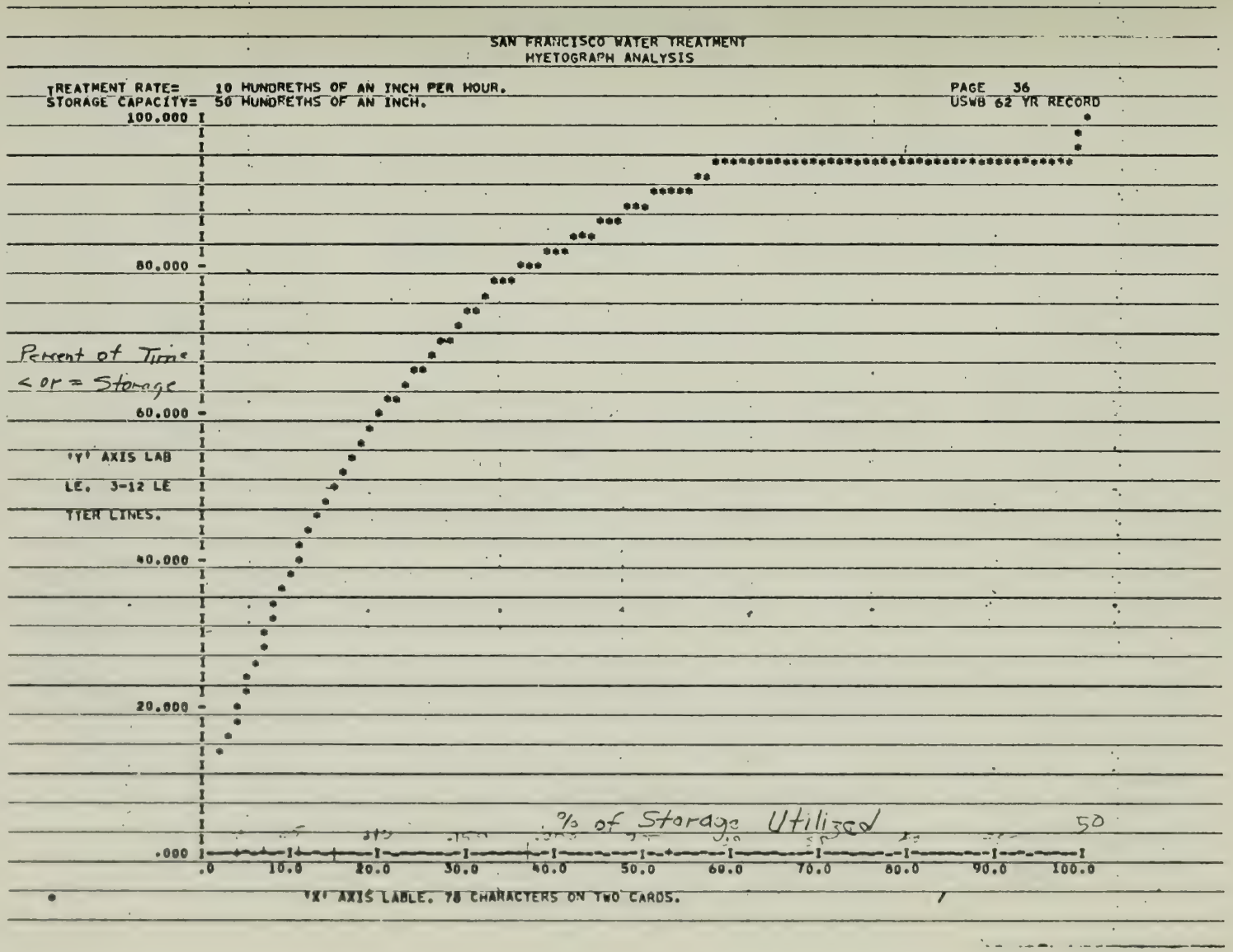

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
PAGE 36
USWB 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Storage Utilized
50
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 59

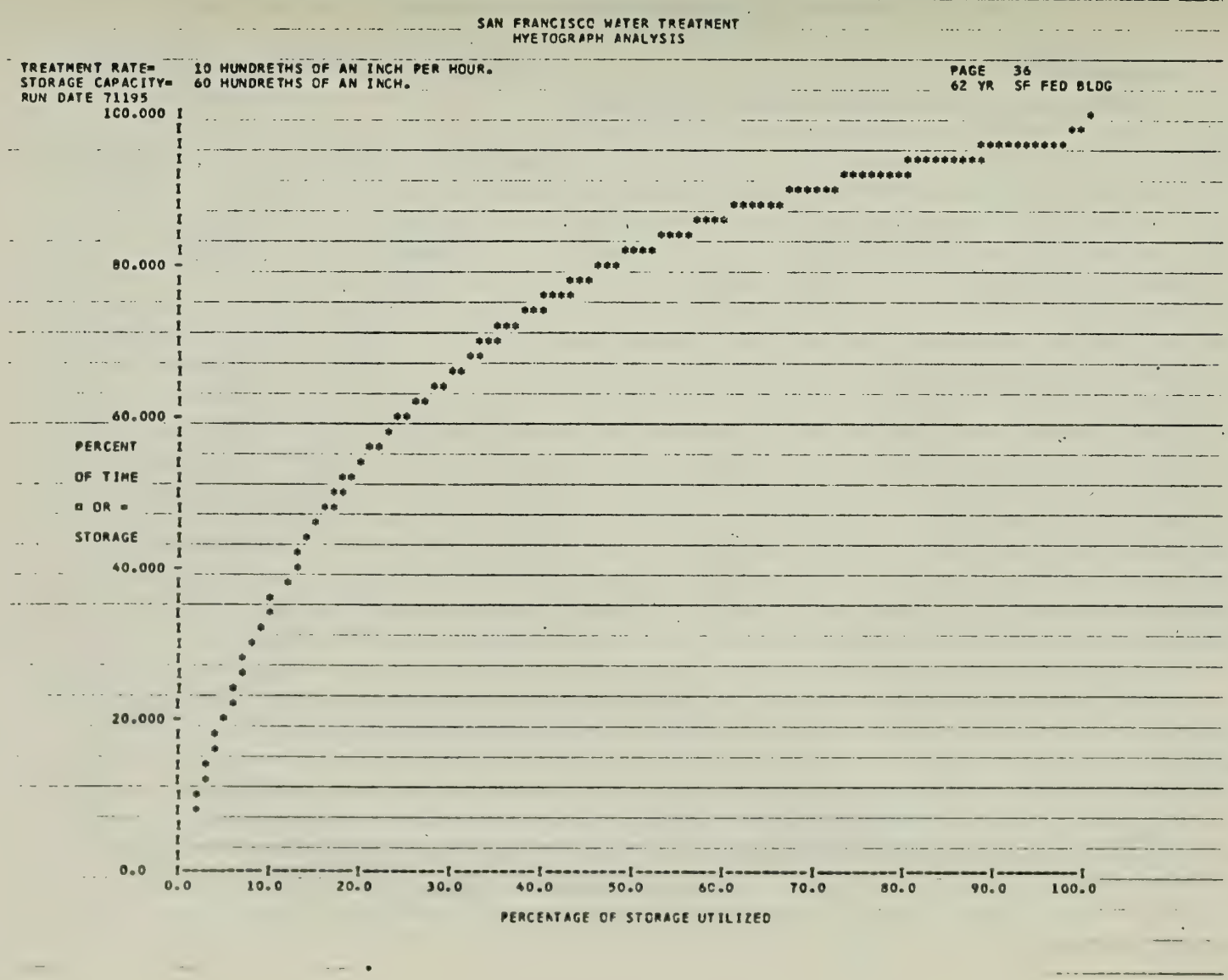

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 60 HUNDRETHS OF AN INCH.
RUN DATE 71195
PAGE 36
62 YR SF FED BLDG
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 60

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.

PAGE 36
USWB 62 YR RECORD

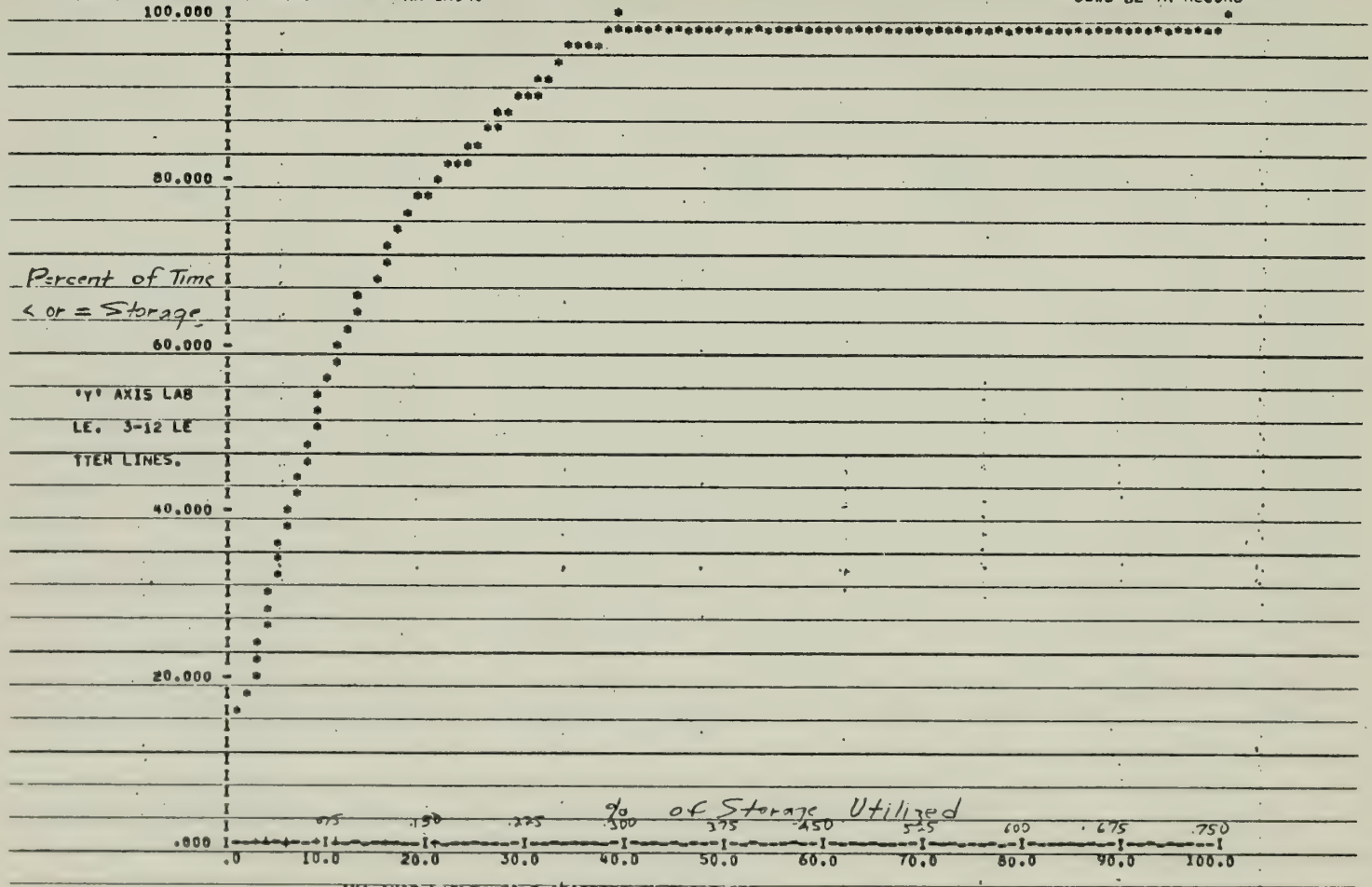


PLATE 61

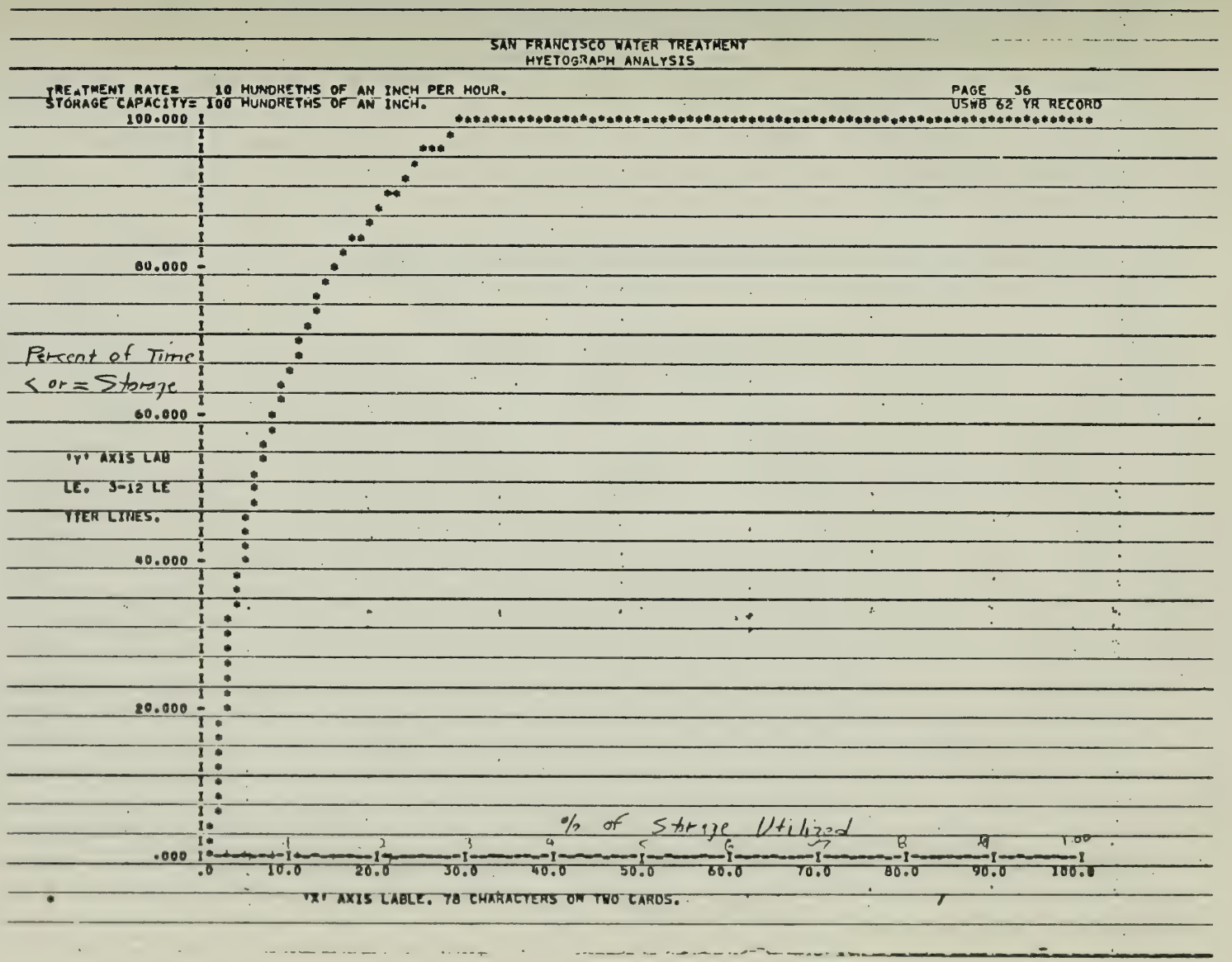

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
PAGE 36
USW8 62 YR RECORD
100.000
80.000
60.000
40.000
20.000
.000
Percent of Time
< or = Storage
'Y' AXIS LAB
LE. 3-12 LE
TTER LINES.
% of Strage Utilized
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
'X' AXIS LABLE. 78 CHARACTERS ON TWO CARDS.

PLATE 62

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.

PAGE 36
USWB 62 YR RECORD

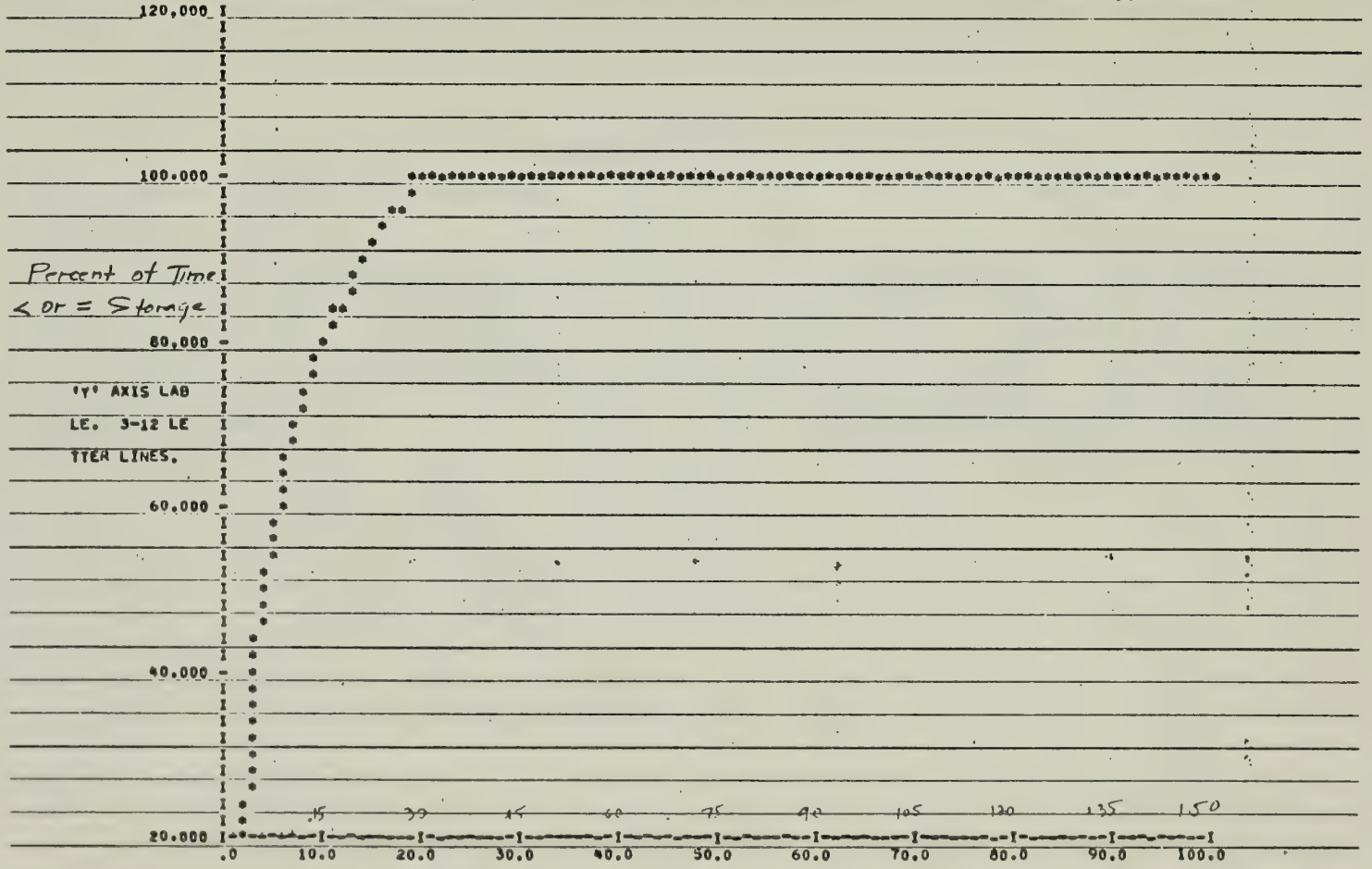


PLATE 63

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 12 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
RUN DATE 71146

62YR SF FED BLDG

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	--TREATMENT-- HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	******3	#4	********5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1580 EVENTS		120.6**	1.6	1.6	32.0	0.0	1.6	0.0	0.0*					15.0	66.5	0.5	0.0	0.0	0.0	0.0
AVERAGE 1580 OVERFLOW EVENTS			1.6	1.6	32.0	0.0	1.6	0.0*	1.0	1.6	13.2	12.3		15.0	66.5	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 24 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 25.484
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 25.484
AVERAGE ANNUAL OVERFLOW, IN INCHES = 3.373

PLATE 64

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 14 HUNDRETHS OF AN INCH PER HOUR. PAGE 27
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71146

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	--TREATMENT-- HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1262 EVENTS		140.6**	1.5	1.5	33.8	0.0	1.5	0.0	0.0*						18.7	87.0	0.5	0.0	0.0	0.0	0.0
AVERAGE 1262 OVERFLOW EVENTS			1.5	1.5	33.8	0.0	1.5	0.0*	1.0	1.5	12.9	12.3			18.7	87.0	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 22 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 20.355
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 20.355
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.627

PLATE 65

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 16 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
RUN DATE 71146

62YR SF FED BLDG

EVENT	DAY	DATE	HRS NO	--RAINFALL--			HRS TO	--STORAGE-		--OVERFLOW--				TREATMENT	--AGE OF STORAGE---				
		YYMMDD	HR STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4 *******	5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1001 EVENTS			162.5**	1.4	1.4	35.5	0.0	1.4	0.0	0.0*				23.6	113.2	0.5	0.0	0.0	0.0	0.0
AVERAGE 1001 OVERFLOW EVENTS				1.4	1.4	35.5	0.0	1.4	0.0*	1.0	1.4	12.8	12.4	23.6	113.2	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 20 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 16.145
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 16.145
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.059

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 18 HUNDRETHS OF AN INCH PER HOUR. PAGE 18
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71146

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO.	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 814 EVENTS				184.4**	1.4	1.4	36.9	0.0	1.4	0.0	0.0*					29.1	142.5	0.5	0.0	0.0	0.0	0.0
AVERAGE 814 OVERFLOW EVENTS					1.4	1.4	36.9	0.0	1.4	0.0*	1.0	1.4	12.4	12.1		29.1	142.5	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 23 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 13.129
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 13.129
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.625

PLATE 67

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 20 HUNDRETHS OF AN INCH PER HOUR. PAGE 15
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71146

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	690 EVENTS			197.3**	1.3	1.3	37.4	0.0	1.3	0.0	0.0*					34.3	171.1	0.5	0.0	0.0	0.0	0.0
AVERAGE	690 OVERFLOW EVENTS				1.3	1.3	37.4	0.0	1.3	0.0*	1.0	1.3	11.6	11.4		34.3	171.1	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 26 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 11.129
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 11.129
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.289

PLATE 68

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 25 HUNDREDTHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDREDTHS OF AN INCH.
RUN DATE 71146

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	404 EVENTS			273.0**	1.2	1.2	40.6	0.0	1.2	0.0	0.0*					58.6	300.9	0.5	0.0	0.0	0.0	0.0
AVERAGE	404 OVERFLOW EVENTS				1.2	1.2	40.6	0.0	1.2	0.0*	1.0	1.2	11.0	10.9	58.6	300.9	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 33 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 6.516
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 6.516
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.719

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 30 HUNDRETHS OF AN INCH PER HOUR. PAGE 6
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71146

EVENT	DAY	DATE	HRS NO	--RAINFALL--			HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20 **21 **22 **23
AVERAGE	236 EVENTS		336.0**	1.1	1.1	44.0	0.0	1.1	0.0	0.0*				99.3	519.2	0.5	0.0	0.0	0.0 0.0
AVERAGE	236 OVERFLOW EVENTS			1.1	1.1	44.0	0.0	1.1	0.0*	1.0	1.1	10.8	10.8	99.3	519.2	0.5	0.0	0.0	0.0 0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 46 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 3.806
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 3.806
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.412

PLATE 70

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 35 HUNDRETHS OF AN INCH PER HOUR. PAGE 4
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 62YR SF FED BLDG
RUN DATE 71146

EVENT	DAY YYMMDD	DATE HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE- DURATN	MAX	--OVERFLOW-- NO. ST.	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	129 EVENTS		358.1**	1.1	1.1	50.1	0.0	1.1	0.0	0.0*					180.9	954.3	0.5	0.0	0.0	0.0	0.0
AVERAGE	129 OVERFLOW EVENTS			1.1	1.1	50.1	0.0	1.1	0.0*	1.0	1.1	11.8	11.7		180.9	954.3	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 45 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 2.081
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.081
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.246

PLATE 71

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 32
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--			HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1511 EVENTS			56.9**	2.4	2.4	21.7	0.0	2.4	0.0	0.0*					4.2	7.3	0.5	0.0	0.0	0.0	0.0
AVERAGE 1511 OVERFLOW EVENTS				2.4	2.4	21.7	0.0	2.4	0.0*	1.0	2.4	16.8 11.4			4.2	7.3	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 24 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 71.952
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 71.952
AVERAGE ANNUAL OVERFLOW, IN INCHES = 12.096

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 16
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--			HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 736 EVENTS			106.6**	11.4	7.3	47.7	7.3	18.7	19.4	3.1*					20.1	38.7*****	11.4	16.5	5.1	5.8	
AVERAGE 146 OVERFLOW EVENTS				33.8	19.8	156.2	17.3	51.1	11.8*	9.5	7.2	54.5 22.9			52.5	103.7*****	32.7	47.3	14.3	15.9	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 20 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.048
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 6.952
AVERAGE ANNUAL OVERFLOW, IN INCHES = 3.786

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 16
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--			HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 701 EVENTS			109.6**	13.3	7.8	50.2	9.5	22.8	25.3	4.6*					24.1	46.9*****	19.6	20.3	11.4	11.0	
AVERAGE 48 OVERFLOW EVENTS				65.3	32.9	275.5	35.1	100.5	19.8*	18.9	9.3	75.1 24.1			102.1	202.6*****	155.5	96.8	107.5	86.6	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 33.381
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.286
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.716

PLATE 72

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 15
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	--AGE OF STORAGE-- AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	688 EVENTS		109.6**	14.2	7.9	51.2	10.3	24.4	27.4	5.5*					25.8	50.2	-17.2	17.8	20.4	29.8	15.6
AVERAGE	22 OVERFLOW EVENTS		107.9	48.1	406.0	51.0	158.9	23.4*	30.8	9.7	88.7	20.7	160.5	319.5	*****	224.2	123.8	780.9	297.1		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.762
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.048
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.930

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 15
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	--AGE OF STORAGE-- AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	685 EVENTS		109.7**	14.4	8.0	51.4	10.6	24.9	28.2	6.1*					26.3	51.2	*****	12.9	20.8	5.1	7.4
AVERAGE	7 OVERFLOW EVENTS		184.9	76.9	711.1	70.3	255.1	26.4*	57.6	20.7	201.3	42.0	256.1	511.3	*****	92.2	200.7	-40.1	41.4		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.619
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.333
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.671

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR. PAGE 15
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	QUANTY	--TREATMENT-- AGE1	AGE2	--AGE OF STORAGE-- AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	683 EVENTS		109.9**	14.5	8.0	51.6	10.8	25.3	28.8	6.5*					26.6	51.8	*****	18.2	21.3	14.1	8.7
AVERAGE	5 OVERFLOW EVENTS		185.2	78.6	752.4	84.2	269.4	27.1*	40.4	20.6	213.8	39.0	270.6	540.4	*****	20.7	244.9	*****	196.7		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.524
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.238
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.509

PLATE 73

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--		TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12 13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	683 EVENTS		109.8**	14.5	8.0	51.6	11.0	25.4	29.1	6.5*			26.8	52.2	6.0	12.9	21.3 6.1 7.9
AVERAGE	5 OVERFLOW EVENTS		185.2	78.6	752.4	109.2	294.4	27.1*	49.6	15.4	163.8	45.2	295.6	590.4	49.6	102.6	251.9 61.6 97.6

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.524
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.238
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.390

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 350 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--		TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12 13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	682 EVENTS		108.4**	15.0	8.0	51.7	10.7	25.7	29.4	6.6*			27.0	52.6	6.2	13.1	21.6 6.1 8.0
AVERAGE	3 OVERFLOW EVENTS		247.7	93.3	920.0	115.0	362.7	28.0*	54.3	20.0	194.7	19.0	364.0	727.0	67.6	129.5	327.0 76.1 125.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.476
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.143
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.278

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 400 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--		TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12 13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	682 EVENTS		108.3**	15.0	8.0	51.7	10.8	25.8	29.7	6.6*			27.1	52.8	1.9	13.2	21.7 42.9 5.2
AVERAGE	3 OVERFLOW EVENTS		247.7	93.3	920.0	140.0	387.7	28.0*	58.7	15.7	144.7	35.0	389.0	777.0	*****	140.7	353.3 **********

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 32.476
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.143
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.207

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 1170 EVENTS			65.8**	2.2	2.2 24.9	0.0	2.2	0.0	0.0*				5.5	15.2	0.5	0.0	0.0	0.0	0.0
AVERAGE 1170 OVERFLOW EVENTS				2.2	2.2 24.9	0.0	2.2	0.0	1.0	2.2	16.0	11.8	5.5	15.2	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 21 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 55.714
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 55.714
AVERAGE ANNUAL OVERFLOW, IN INCHES = 8.907

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 801 EVENTS			91.3**	5.8	5.2 40.4	2.2	8.0	11.6	1.9*				10.8	35.5	1.6	4.2	6.2	2.1	2.4
AVERAGE 219 OVERFLOW EVENTS				12.7	10.8 102.8	4.2	17.0	6.6*	4.2	4.2	36.6	22.6	19.6	70.9	3.4	9.7	14.9	4.6	5.4

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 20 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 38.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 10.429
AVERAGE ANNUAL OVERFLOW, IN INCHES = 3.821

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE--		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 766 EVENTS			94.8**	6.8	5.5 42.5	2.8	9.6	16.6	2.5*				12.4	42.0	2.1	5.2	7.7	2.4	2.9
AVERAGE 105 OVERFLOW EVENTS				19.7	14.9 148.7	7.7	27.4	11.3*	6.8	4.5	40.6	22.0	29.8	112.4	6.2	16.1	25.4	7.4	8.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 36.476
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 5.000
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.029

PLATE 75

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	746 EVENTS		96.6**	7.4	5.7	43.7	3.1	10.519.2	3.0*						13.3	45.5	2.3	5.6	8.6	2.6	3.2
AVERAGE	50 OVERFLOW EVENTS			27.7	19.8	204.1	11.3	39.015.2*	9.0	5.4	49.6	23.2		41.5	159.0	8.8	22.6	37.2	10.4	12.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.524
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.381
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.180

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	740 EVENTS		97.3**	7.6	5.8	44.1	3.3	10.920.4	3.3*						13.7	47.1	2.4	5.9	8.9	2.7	3.3
AVERAGE	26 OVERFLOW EVENTS			38.2	24.3	263.8	12.9	51.117.5*	12.4	6.8	61.0	20.9		53.8	207.3	11.4	28.6	48.4	13.5	16.7

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.238
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.238
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.756

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--RAINFALL--		HRS TO	--STORAGE-		--OVERFLOW--			TREATMENT		--AGE OF STORAGE---				
		YYMMDD HR	STORAG	DURATN	HOURS QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4 AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19 **20 **21 **22 **23
AVERAGE	738 EVENTS		97.4**	7.7	5.8	44.2	3.4	11.221.4	3.6*						14.0	48.2	2.5	6.0	9.2	2.8	3.4
AVERAGE	5 OVERFLOW EVENTS			56.0	46.2	526.6	30.8	86.820.5*	22.4	17.0	180.8	54.4		88.8	349.8	18.1	47.7	85.1	25.8	32.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.238
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.430

PLATE 76

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	****2	*****3	*4	*******5	******6	****7	*****8	******9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	737 EVENTS			97.4**	7.8	5.8	44.3	3.5	11.3	21.7	3.6*				14.1	48.6*****	6.1	9.3	2.8	3.3	
AVERAGE	5 OVERFLOW EVENTS			68.0	49.4	551.8	37.6	105.6	20.5*	29.4	12.6	130.8	33.4	107.6	425.0*****	56.8	99.5	20.7	27.4		

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.095
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.238
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.311

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	****2	*****3	*4	*******5	******6	****7	*****8	******9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	735 EVENTS			97.6**	8.0	5.8	44.4	3.4	11.4	21.9	3.7*				14.2	49.0	2.6	6.1	9.3	2.8	3.4
AVERAGE	4 OVERFLOW EVENTS			107.5	51.3	615.3	19.8	127.3	20.7*	34.0	10.8	108,5	31.5	129.5	511.3	33.6	62.5	116.8	28.7	39.1	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.000
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.190
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.207

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	****2	*****3	*4	*******5	******6	****7	*****8	******9	****10	*11	*12	13 *14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	735 EVENTS			97.5**	8.0	5.8	44.4	3.5	11.4	22.1	3.8*				14.3	49.2	2.6	6.1	9.3	2.8	3.4
AVERAGE	2 OVERFLOW EVENTS			94.0	53.5	700.0	44.0	138.0	21.4*	32.0	15.5	148.5	39.0	139.5	553.0	33.9	63.4	123.0	33.4	44.0	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 19 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 35.000
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.095
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.141

PLATE 77

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	888 EVENTS		78.8**	2.0	2.0	27.9	0.0	2.0	0.0	0.0*					7.2	25.2	0.5	0.0	0.0	0.0	0.0
AVERAGE	888 OVERFLOW EVENTS			2.0	2.0	27.9	0.0	2.0	0.0	0.0*	1.0	2.0	15.8	12.7	7.2	25.2	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 42.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 42.286
AVERAGE ANNUAL OVERFLOW, IN INCHES = 6.701

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	655 EVENTS		103.2**	5.1	4.7	43.8	1.3	6.4	12.1	1.8*					11.4	47.7	1.2	3.2	4.5	1.7	1.9
AVERAGE	175 OVERFLOW EVENTS			10.3	9.3	103.8	2.5	12.8	7.5*	3.7	3.2	29.6	20.7	17.3	85.1	2.3	7.1	10.6	3.4	4.0	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 31.190
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 8.333
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.468

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	643 EVENTS		103.7**	5.5	5.0	44.9	1.8	7.3	16.4	2.3*					12.2	52.9	1.5	3.7	5.5	1.8	2.2
AVERAGE	70 OVERFLOW EVENTS			16.2	13.9	159.8	5.1	21.3	12.3*	6.2	3.6	34.4	22.8	26.1	137.2	4.0	11.6	19.5	5.5	6.9	

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.619
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 3.333
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.145

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 14
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	--TREATMENT-- HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	635 EVENTS		104.8**	5.7	5.0	45.5	1.9	7.7	18.1	2.7*						12.6	55.3	1.6	3.9	5.9	1.9	2.3
AVERAGE	28 OVERFLOW EVENTS			23.5	19.0	232.3	7.8	31.3	15.4*	7.6	4.9	47.8	22.8			37.3	198.9	5.9	16.4	29.4	7.7	9.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.238
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.333
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.638

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 14
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	--TREATMENT-- HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	633 EVENTS		105.0**	5.9	5.1	45.7	2.0	7.8	18.9	2.9*						12.8	56.2	1.6	3.9	6.0	1.9	2.3
AVERAGE	14 OVERFLOW EVENTS			33.4	24.8	306.6	8.1	41.5	17.0*	9.7	6.4	59.8	18.9			48.6	263.2	7.8	21.3	40.1	10.5	13.4

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.667
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.399

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR. PAGE 14
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST DUR	WSTE	INTL	--TREATMENT-- HOURS	QUANTY	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	633 EVENTS		104.9**	5.9	5.1	45.8	2.0	7.9	19.4	3.0*						12.9	56.8	1.7	4.0	6.1	2.0	2.4
AVERAGE	4 OVERFLOW EVENTS			53.5	42.5	541.8	17.3	70.8	18.6*	24.8	11.8	119.8	39.0			73.5	427.3	11.8	35.3	69.4	17.9	23.7

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.190
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.228

PLATE 79

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	#4	********5		*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	633 EVENTS		104.9**	5.9	5.1	45.8	2.1	8.0	19.7	3.1*					12.9	57.1	1.7	4.1	6.2	2.0	2.4
AVERAGE	2 OVERFLOW EVENTS			55.5	45.0	636.5	25.0	80.5	19.1*	28.5	16.0	157.0	39.5		82.0	481.0	15.5	49.6	79.0	21.9	27.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.095
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.150

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE	HRS NO	--R A I N F A L L--		HRS TO	--STORAGE-		--O V E R F L O W--			T R E A T M E N T		--AGE OF STORAGE---				
	YYMMDD	HR	STORAG	DURATN	HOURS	QUANTY	EMPTY	DURATN	MAX	NO ST	DUR	WSTE	INTL	HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	#4	********5		*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	633 EVENTS		104.9**	5.9	5.1	45.8	2.1	8.0	20.0	3.1*					13.0	57.3	1.7	4.1	6.2	2.0	2.4
AVERAGE	1 OVERFLOW EVENTS			54.0	47.0	756.0	50.0	104.0	19.5*	34.0	19.0	133.0	30.0		104.0	623.0	15.4	60.0	76.2	30.1	35.7

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 16 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 30.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.048
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.063

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 721 EVENTS				90.7**	1.9	1.9	29.8	0.0	1.9	0.0	0.0*					8.8	35.6	0.5	0.0	0.0	0.0	0.0
AVERAGE 721 OVERFLOW EVENTS				1.9	1.9	29.8	0.0	1.9	0.0*	1.0	1.9	14.9	12.6	8.8	35.6	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 34.333
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 34.333
AVERAGE ANNUAL OVERFLOW, IN INCHES = 5.116

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 588 EVENTS				110.7**	3.8	3.8	42.4	0.6	4.4	6.9	1.3*					11.5	51.3	0.7	2.2	2.6	1.2	1.3
AVERAGE 282 OVERFLOW EVENTS				5.4	5.3	68.2	0.8	6.2	4.0*	1.8	2.6	22.3	17.8	13.5	66.1	0.9	3.4	4.3	1.8	1.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 28.000
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 13.429
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.992

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
*1	*2	*3	*4	*5	*6	*7	*8	*9	*10	*11	*12	13	*14	**15	**16	**17	**18	**19	**20	**21	**22	**23
AVERAGE 573 EVENTS				111.8**	4.3	4.2	44.3	0.9	5.2	11.7	1.7*					12.2	57.6	1.0	2.5	3.5	1.4	1.5
AVERAGE 134 OVERFLOW EVENTS				8.1	7.6	101.2	1.9	9.9	7.7*	3.1	2.7	25.5	19.7	16.3	93.7	1.8	5.6	8.1	2.7	3.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 27.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 6.381
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.629

PLATE 81

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6		****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	559 EVENTS			114.2**	4.7	4.4	45.8	1.2	5.8	15.2	2.1*				12.8	62.6	1.1	2.8	4.0	1.5	1.7
AVERAGE	44 OVERFLOW EVENTS			14.1	12.5	167.4	3.2	17.3	12.2*	4.7	3.4	32.9	23.1		25.6	155.8	3.1	9.6	15.1	4.5	5.4

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.619
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 2.095
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.690

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6		****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	554 EVENTS			115.1**	4.8	4.5	46.3	1.2	6.1	16.4	2.3*				13.1	64.4	1.2	2.9	4.2	1.5	1.7
AVERAGE	16 OVERFLOW EVENTS			20.0	16.9	244.1	5.1	25.1	14.6*	5.6	5.4	46.8	21.9		35.1	221.4	4.7	13.8	21.8	6.2	7.5

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.381
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.762
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.356

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6		****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	552 EVENTS			115.5**	4.9	4.5	46.5	1.3	6.2	16.8	2.3*				13.2	65.2	1.2	2.9	4.4	1.5	1.8
AVERAGE	9 OVERFLOW EVENTS			27.0	23.0	326.9	8.2	35.2	15.5*	9.6	6.2	48.8	17.1		44.9	302.3	6.0	18.3	33.7	8.4	10.6

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.429
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.209

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	#4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 552 EVENTS				115.5**	4.9	4.5	46.5	1.3	6.2	17.2	2.4*					13.2	65.6	1.2	2.9	4.4	1.5	1.8
AVERAGE 2 OVERFLOW EVENTS				55.0	44.5	632.5	10.0	65.0	16.7*	28.0	15.5	116.0	46.5		67.5	523.0	8.3	33.3	63.0	15.9	20.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.095
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.110

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN	HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO	ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	#4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 552 EVENTS				115.4**	4.9	4.5	46.5	1.3	6.2	17.4	2.4*					13.3	65.8	1.2	3.0	4.4	1.5	1.8
AVERAGE 2 OVERFLOW EVENTS				55.0	44.5	632.5	16.0	71.0	16.7*	33.5	12.0	66.0	14.5		73.5	573.0	9.9	38.4	65.6	16.9	21.8

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.095
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.063

PLATE 83

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 0 HUNDRETHS OF AN INCH.
STATICN NUMBER 47767
RUN DATE 71142

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 557 EVENTS			102.1**	1.7	1.7	31.9	0.0	1.7	0.0	0.0*						11.4	50.7	0.5	0.0	0.0	0.0	0.0
AVERAGE 557 OVERFLOW EVENTS				1.7	1.7	31.9	0.0	1.7	0.0	0.0*	1.0	1.7	14.7	13.3		11.4	50.7	0.5	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 26.524
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 26.524
AVERAGE ANNUAL OVERFLOW, IN INCHES = 3.902

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.
STATICN NUMBER 47767
RUN DATE 71142

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 461 EVENTS			123.5**	3.7	3.7	46.3	0.4	4.0	7.2	1.2*						14.2	69.1	0.7	1.9	2.3	1.1	1.2
AVERAGE 232 OVERFLOW EVENTS				4.9	4.8	69.5	0.5	5.4	4.4*	1.7	2.4	19.8	16.9			14.7	79.4	0.8	2.9	3.5	1.6	1.7

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.952
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 11.048
AVERAGE ANNUAL OVERFLOW, IN INCHES = 2.186

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 17 HUNDRETHS OF AN INCH.
STATICN NUMBER 47767
RUN DATE 71196

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 457 EVENTS			122.9**	3.9	3.8	47.2	0.5	4.4	10.0	1.4*						14.5	72.5	0.0	0.0	0.0	0.0	0.0
AVERAGE 154 OVERFLOW EVENTS				5.9	5.8	85.7	0.9	6.8	6.5*	2.3	2.4	21.4	17.6			16.0	93.0	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 24.053
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 8.105
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.731

PLATE 84

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 11
21YR RICHMOND-47767

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	453 EVENTS		123.2**	4.0	4.0	47.8	0.7	4.7	12.1	1.6*						14.8	75.3	0.9	2.2	2.9	1.2	1.3
AVERAGE	99 OVERFLOW EVENTS			7.1	6.9	104.6	1.4	8.5	8.5*	2.8	2.6	23.5	18.8			17.4	108.5	1.5	4.7	6.4	2.4	2.6

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.571
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 4.714
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.106

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 29 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71196

PAGE 11
19 YR RICH-SUN DIST

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	453 EVENTS		123.1**	4.0	4.0	47.9	0.7	4.8	12.9	1.6*						14.9	76.1	0.0	0.0	0.0	0.0	0.0
AVERAGE	79 OVERFLOW EVENTS			7.9	7.6	115.6	1.6	9.5	9.5*	3.0	2.7	25.0	19.7			18.3	117.9	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 23.842
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 4.158
AVERAGE ANNUAL OVERFLOW, IN INCHES = 1.041

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 10
21YR RICHMOND-47767

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL	TREATMENT HOURS	QUANTY	AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	*4	*******5	******6	****7	******8	******9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	447 EVENTS		125.1**	4.2	4.1	48.7	0.9	5.1	15.1	1.9*						15.2	79.4	1.0	2.4	3.3	1.3	1.5
AVERAGE	31 OVERFLOW EVENTS			11.3	10.5	167.1	2.9	14.2	12.5*	4.1	3.3	30.0	22.9			24.7	168.2	2.6	7.9	12.1	3.8	4.5

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.286
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.476
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.443

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 10
STORAGE CAPACITY= 60 HUNDRETHS OF AN INCH. 19 YR RICH-SUN DIST
STATION NUMBER 47767
RUN DATE 71196

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2		*****3	*4	*******5	*****6	*****7		*****8	*****9	*****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 445 EVENTS			125.6**	4.3	4.1	49.0	0.9		5.215.7	2.0*						15.4	80.3	C.0	0.0	0.0	0.0	0.0
AVERAGE 23 OVERFLOW EVENTS			12.8	11.8	187.0	3.4			16.213.3*	4.2	3.7	29.7	21.3			27.5	188.8	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 23.421
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 1.211
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.359

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 10
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2		*****3	*4	*******5	*****6	*****7		*****8	*****9	*****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 444 EVENTS			125.9**	4.3	4.2	49.2	0.9		5.216.3	2.0*						15.4	81.1	1.0	2.4	3.5	1.3	1.5
AVERAGE 13 OVERFLOW EVENTS			15.8	13.8	222.0	3.5			19.214.6*	5.9	4.4	32.6	22.2			31.2	221.2	3.7	11.8	17.0	5.6	6.5

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.619
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.202

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 10
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	INTL HOURS	TREATMENT QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
*****1	*****2		*****3	*4	*******5	*****6	*****7		*****8	*****9	*****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE 444 EVENTS			125.8**	4.4	4.2	49.3	0.9		5.316.8	2.1*						15.5	81.6	1.0	2.5	3.5	1.3	1.5
AVERAGE 6 OVERFLOW EVENTS			19.7	17.0	282.0	5.5			25.215.7*	7.3	6.0	33.7	17.5			31.5	264.5	4.9	15.6	23.6	7.4	8.9

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.286
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.096

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR. PAGE 10
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

EVENT	DAY	DATE YYMMDD	HR	HRS NO STORAG	--RAINFALL-- DURATN HOURS	QUANTY	HRS TO EMPTY	--STORAGE-- DURATN	MAX	--OVERFLOW-- NO ST	DUR	WSTE	TREATMENT INTL HOURS	QUANTY	AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	****2	*****3	**4	*******5	*****6	****7	*****8	*****9	****10	*11	*12	13	*14	**15	**16	***17	****18	**19	**20	**21	**22	**23
AVERAGE	444 EVENTS			125.8**	4.4	4.2	49.3	0.9	5.3	17.1	2.2*				15.5	81.9	1.0	2.5	3.6	1.3	1.5
AVERAGE	1 OVERFLOW EVENTS				32.0	32.0	553.0	15.0	47.0	16.8*	6.0	24.0	88.0	8.0	47.0	465.0	10.0	36.9	45.7	18.4	19.1

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 11 DRY PERIODS.

AVERAGE NUMBER OF EVENTS PER YEAR = 21.143
AVERAGE NUMBER OF OVERFLOWS PER YEAR = 0.048
AVERAGE ANNUAL OVERFLOW, IN INCHES = 0.042

PLATE 87

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

21YR RICHMOND-47767

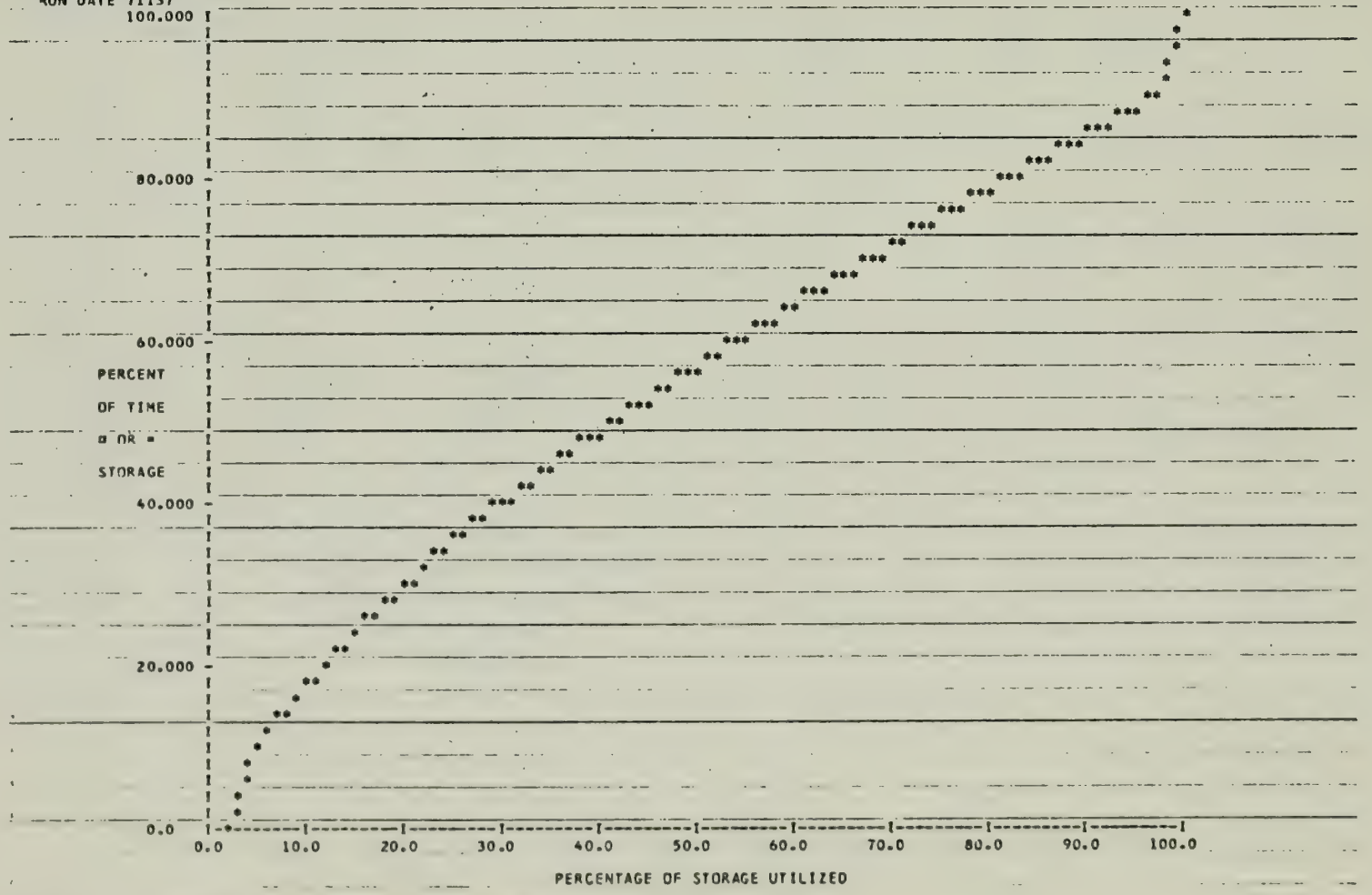


PLATE 88

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

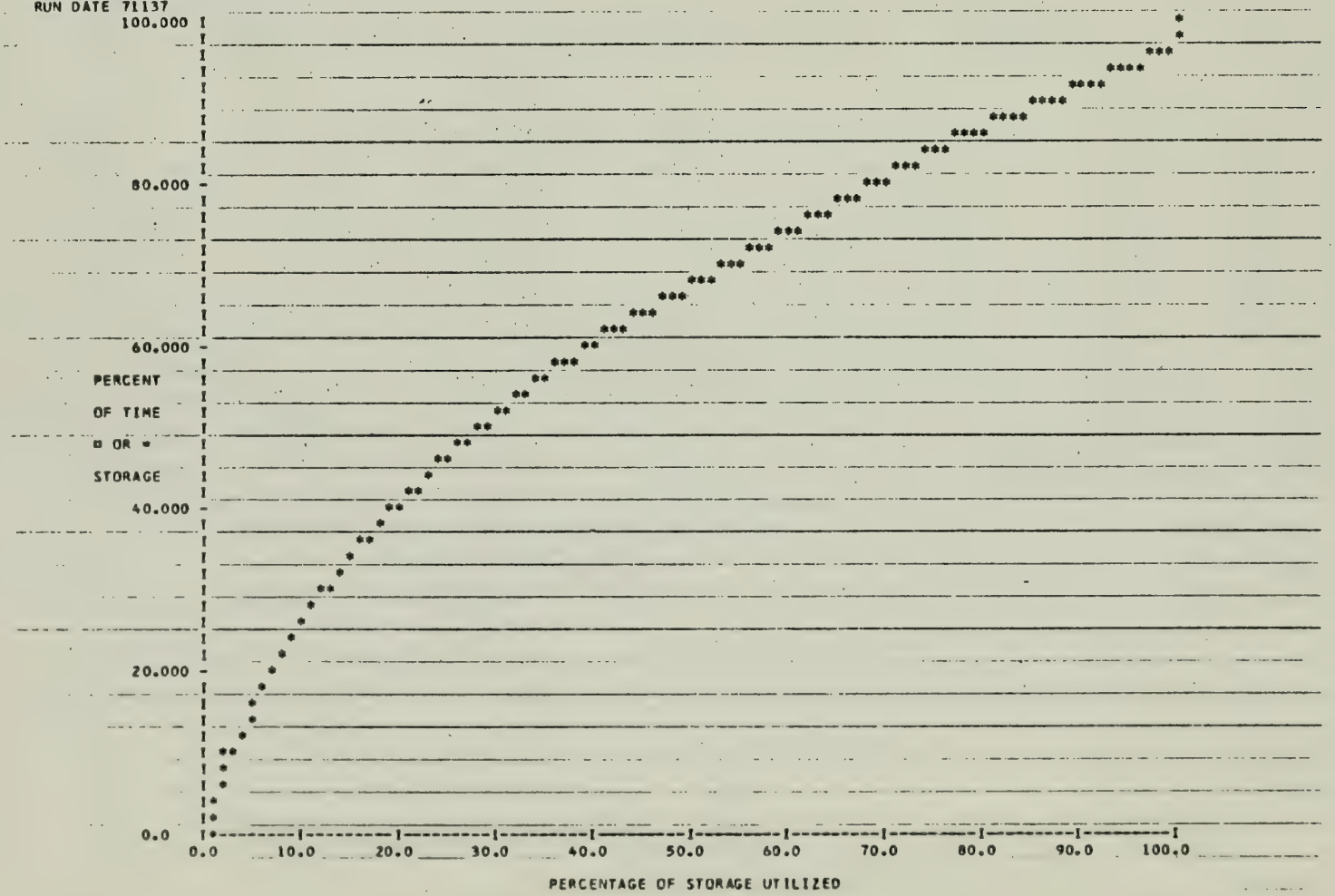


PLATE 89

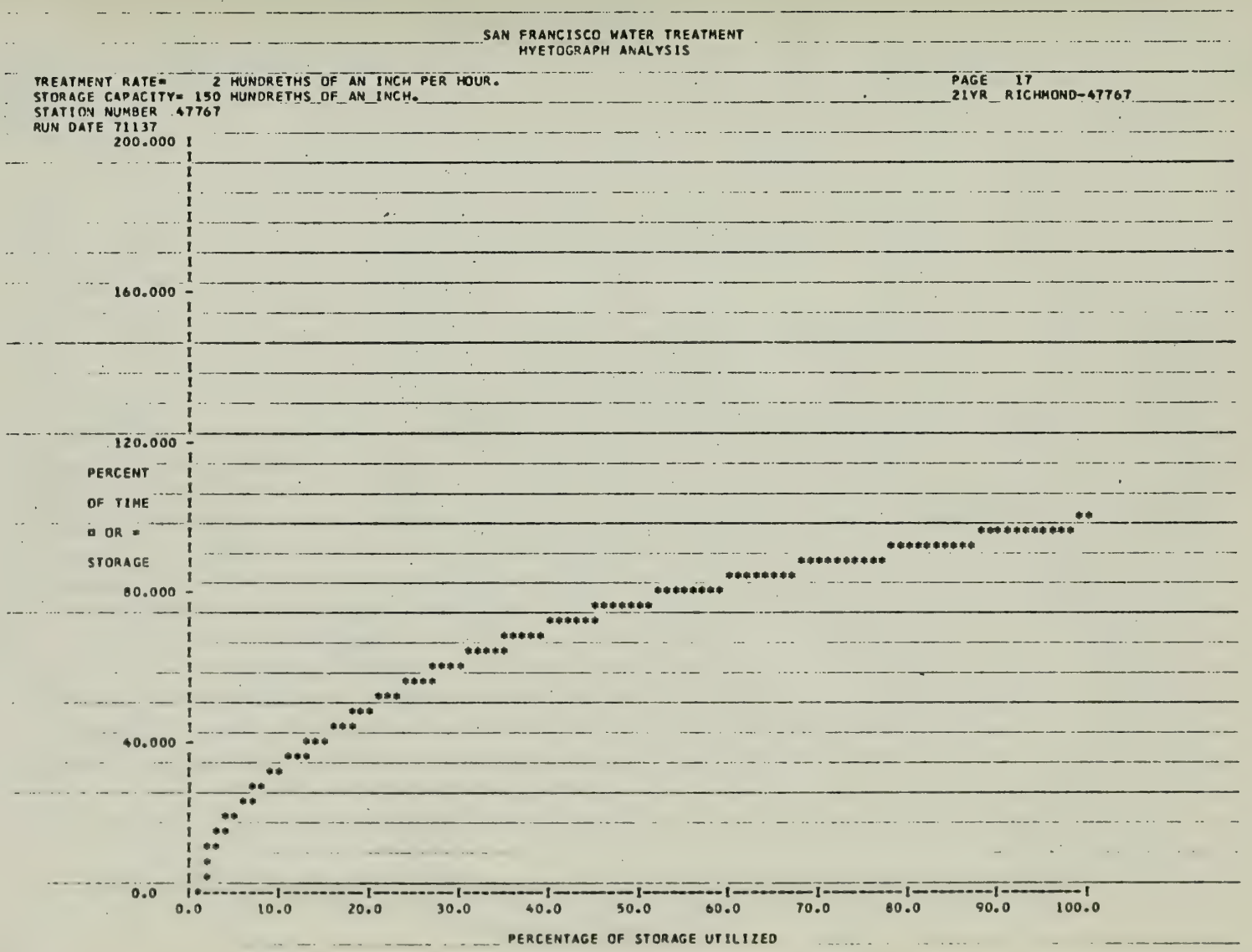

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137
PAGE 17
21YR RICHMOND-47767
200.000
160.000
120.000
80.000
40.000
0.0
PERCENT
OF TIME
□ OR ▪
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 90

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

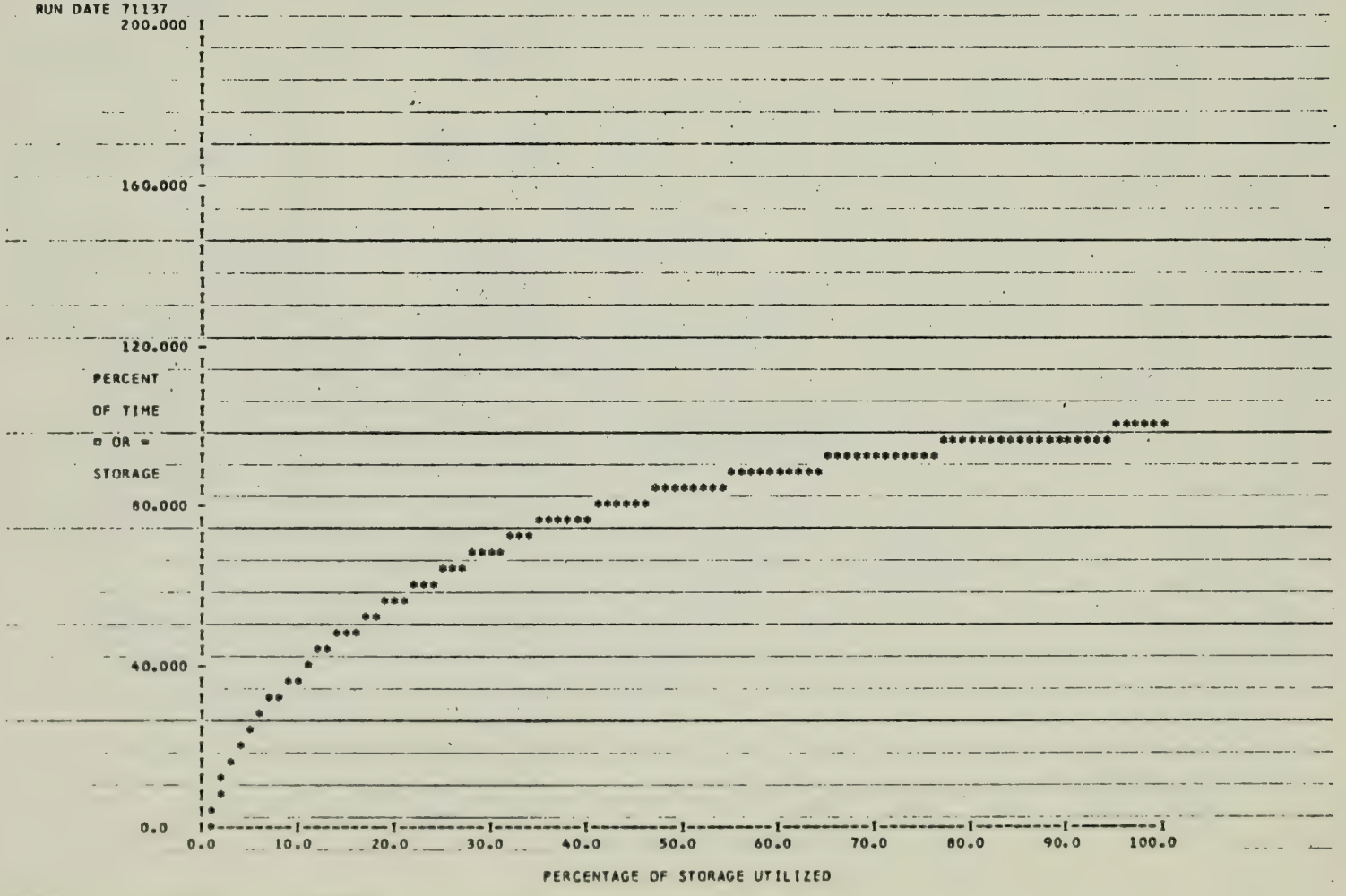


PLATE 91

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

21YR RICHMOND-47767

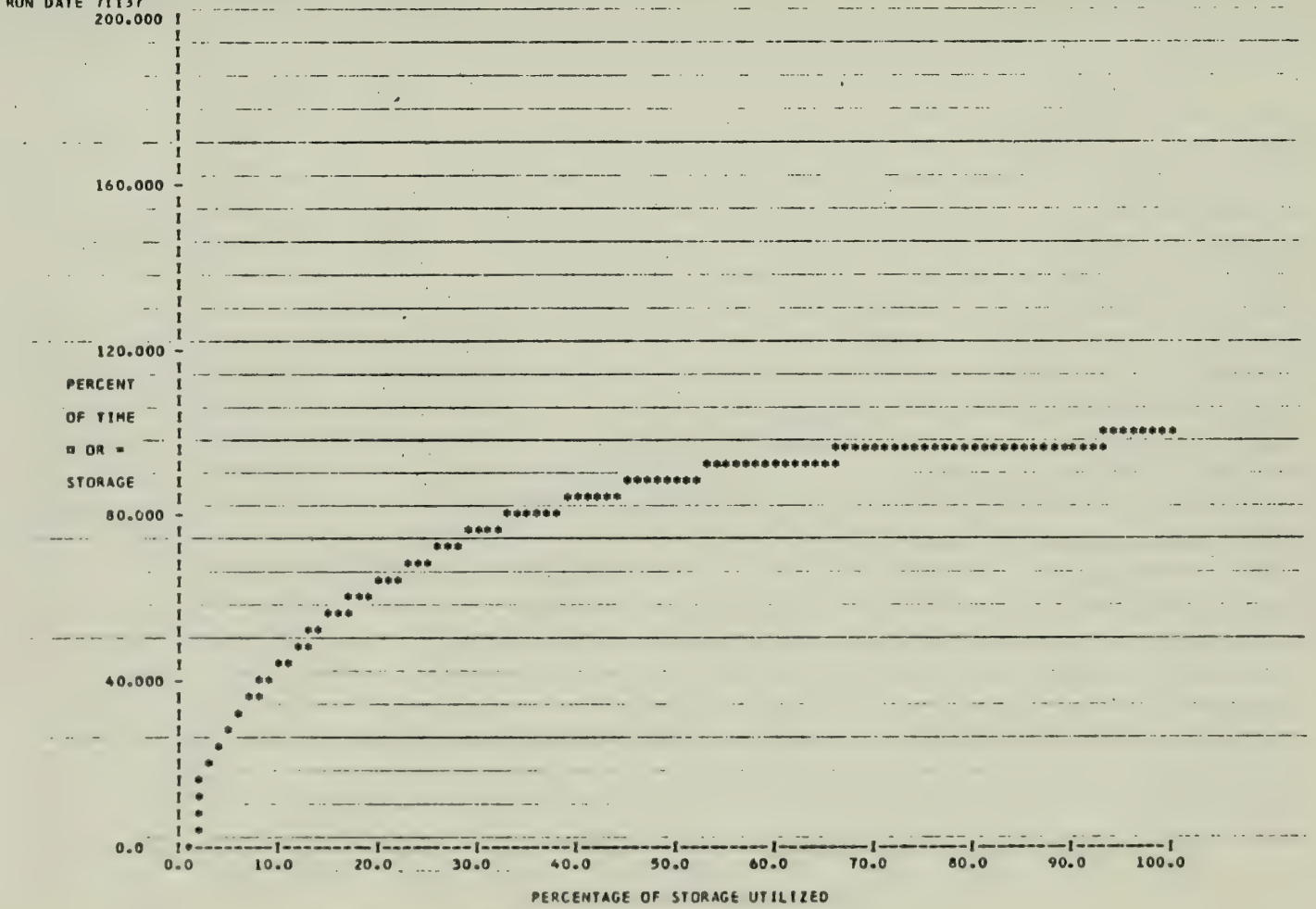


PLATE 92

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

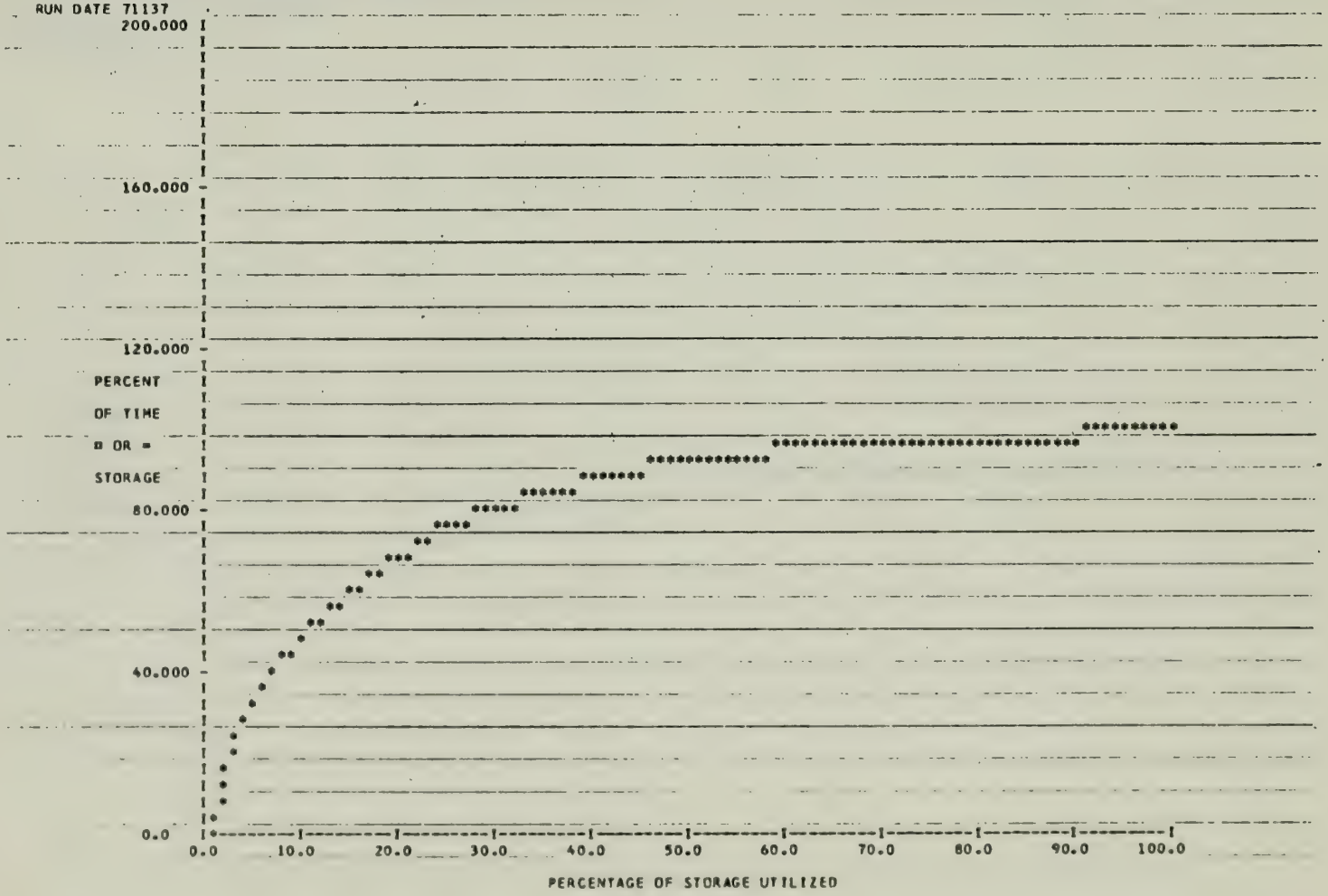


PLATE 93

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 350 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

21YR RICHMOND-47767

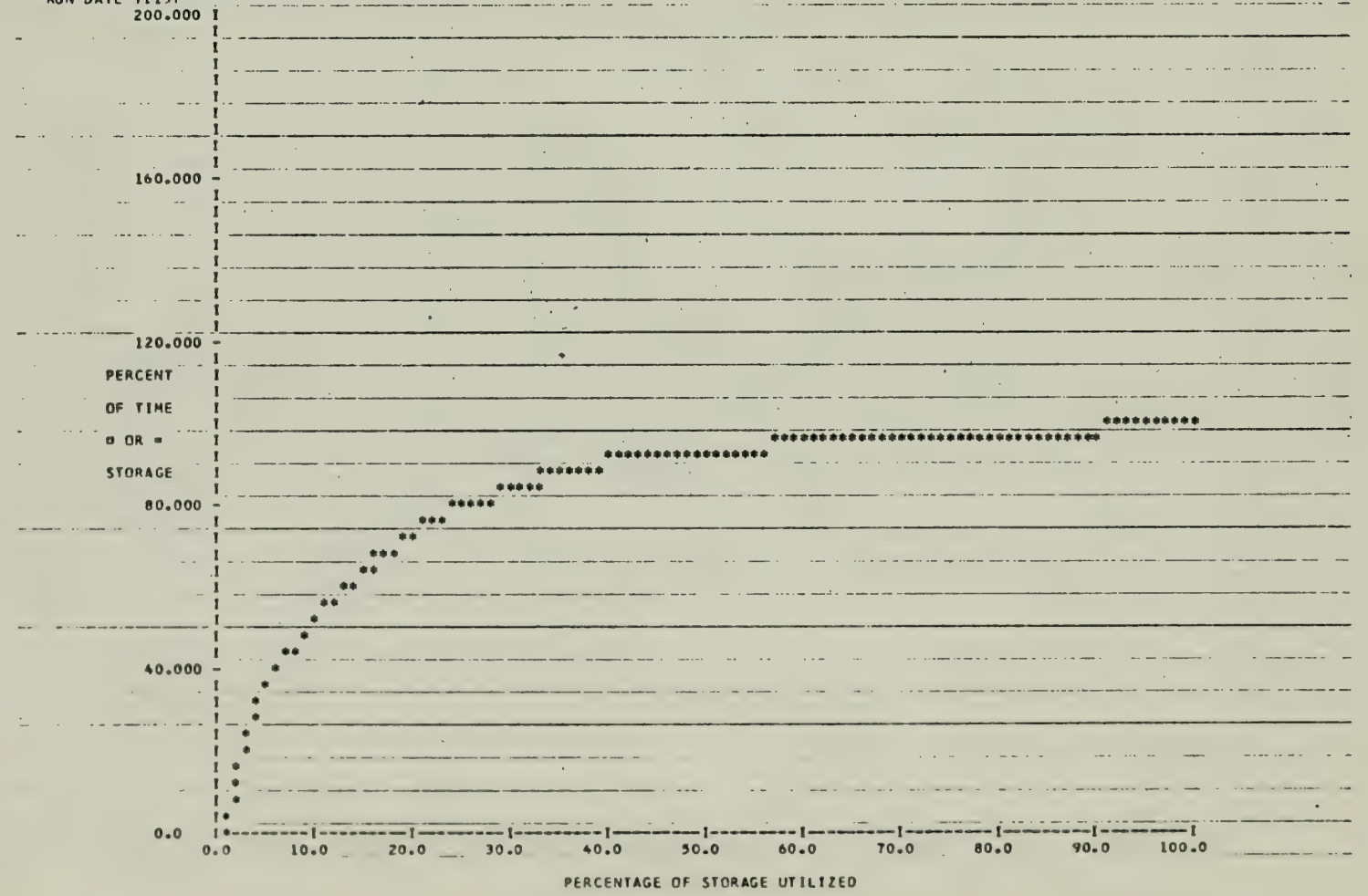


PLATE 94

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 2 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 400 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71137

21YR RICHMOND-47767

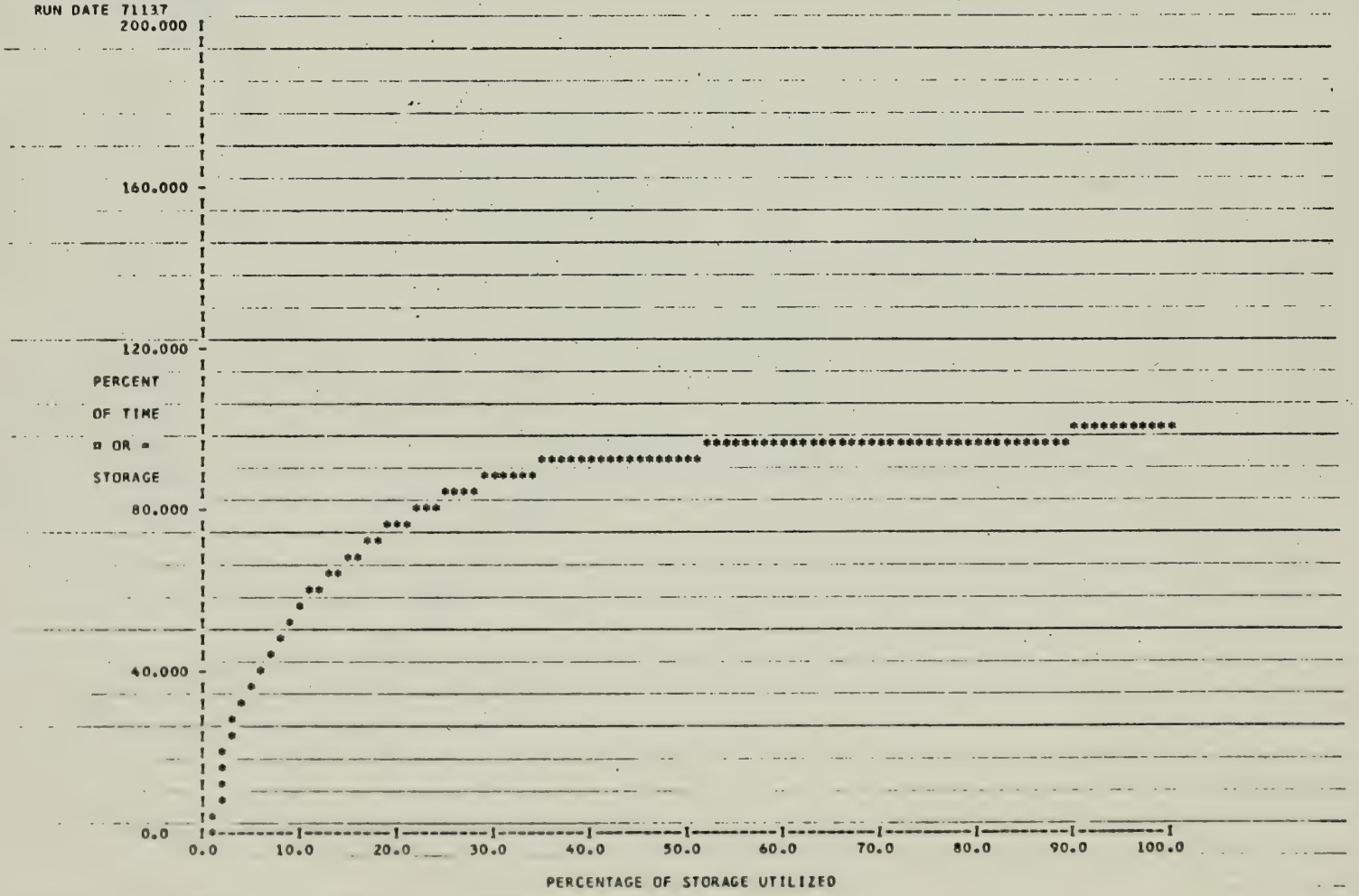


PLATE 95

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 20
21YR RICHMOND-47767

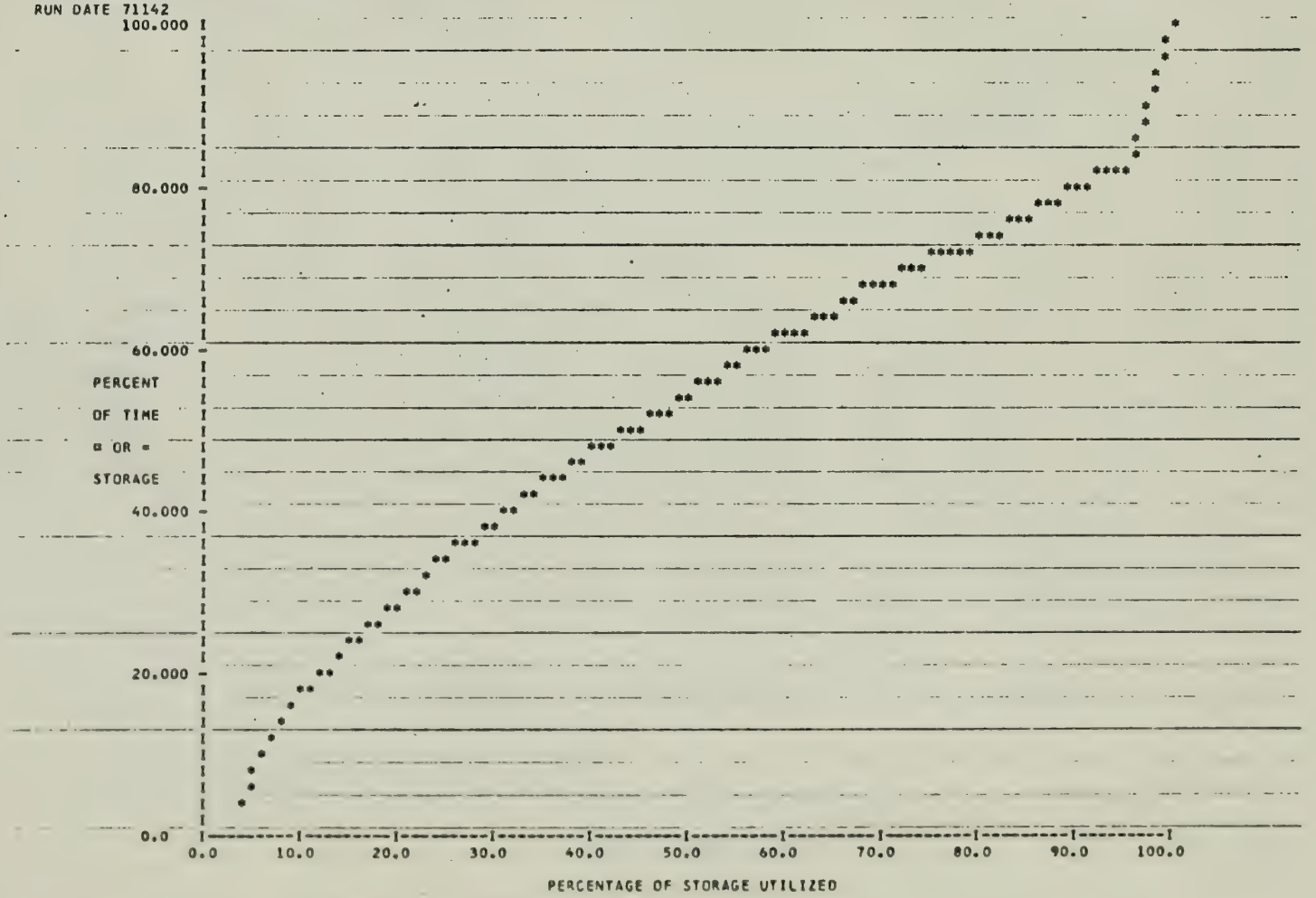


PLATE 96

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 19
21YR RICHMOND-47767

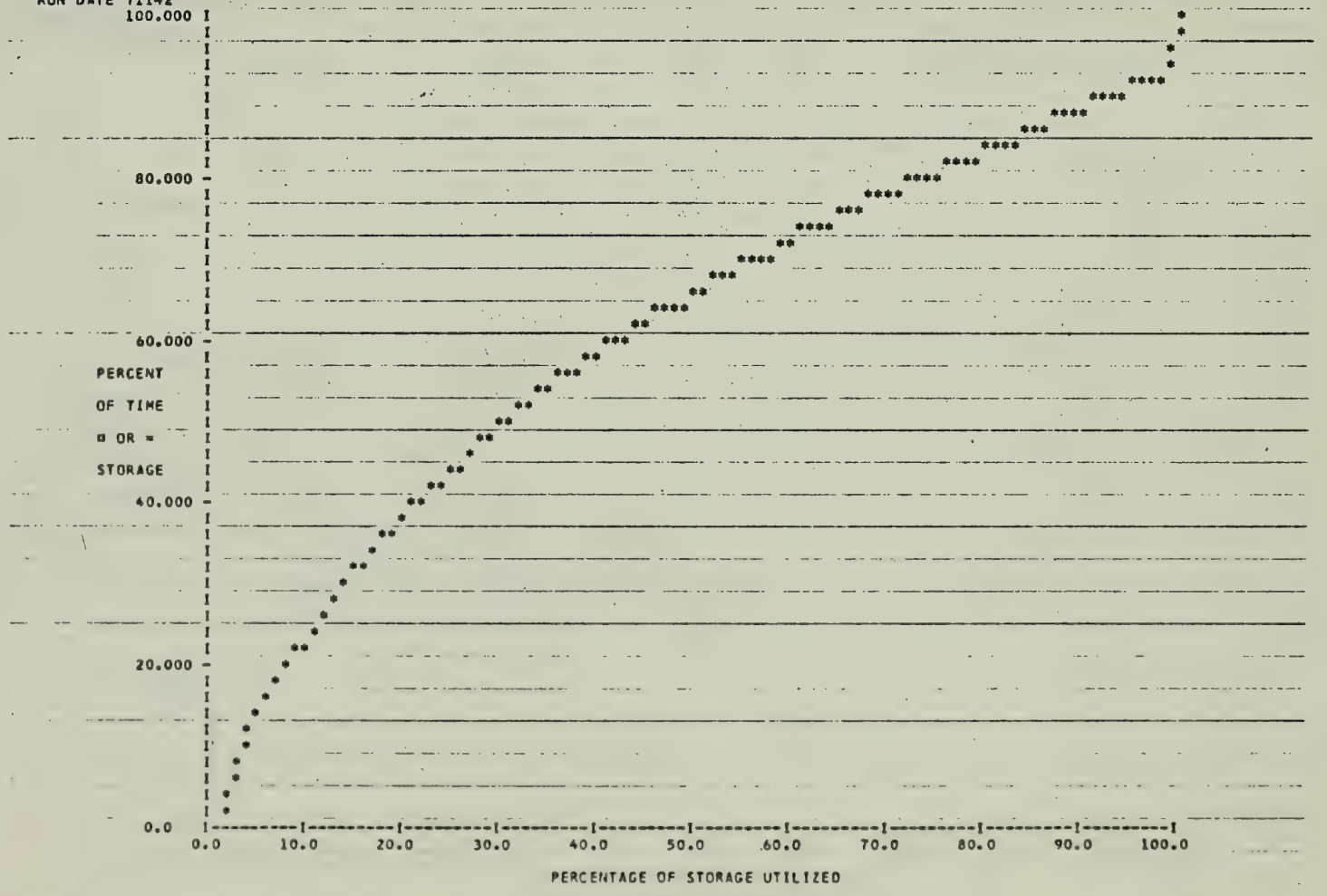


PLATE 97

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 18
21YR RICHMOND-47767

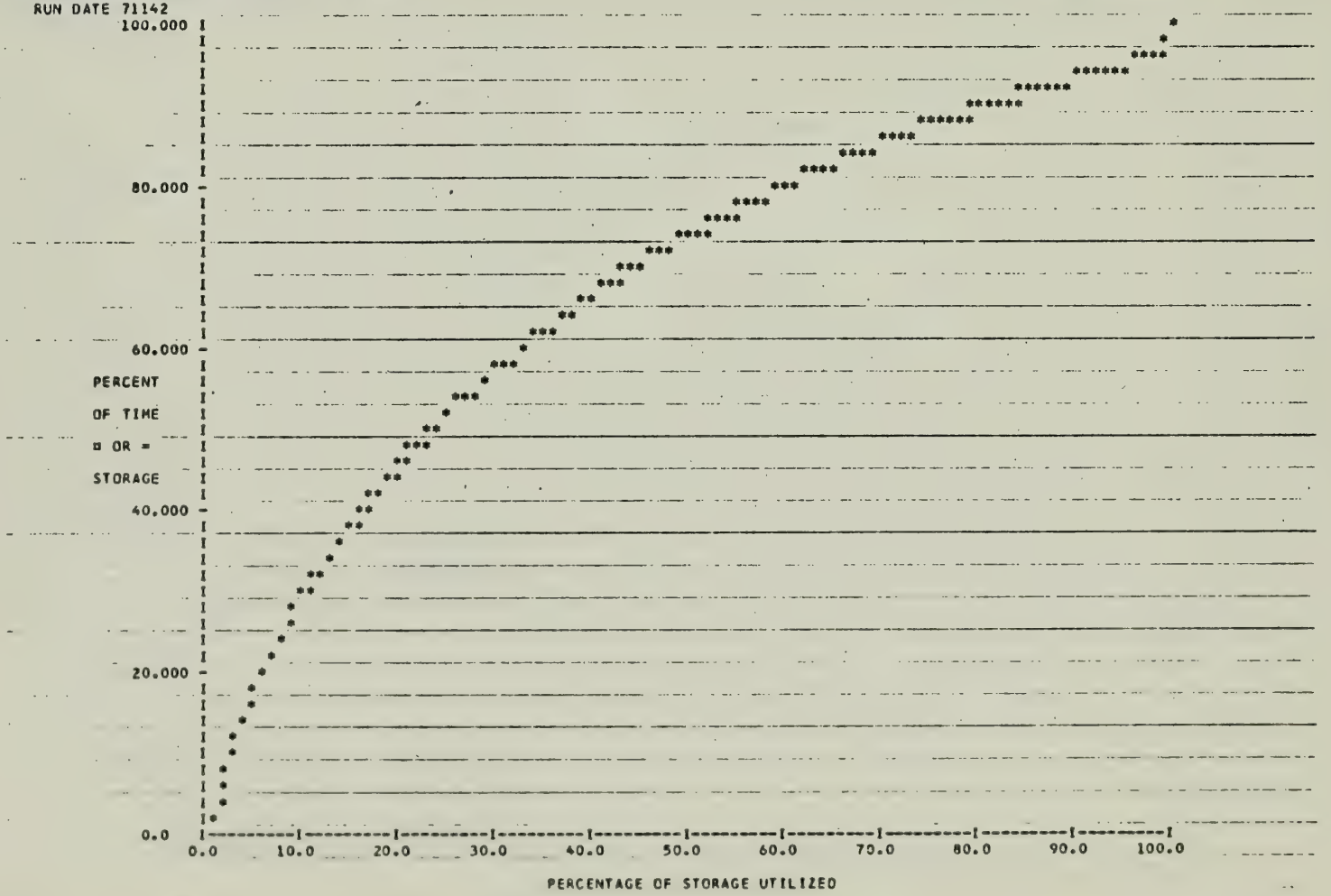


PLATE 98

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR. PAGE 18
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH. 21YR RICHMOND-47767
STATION NUMBER 47767
RUN DATE 71142

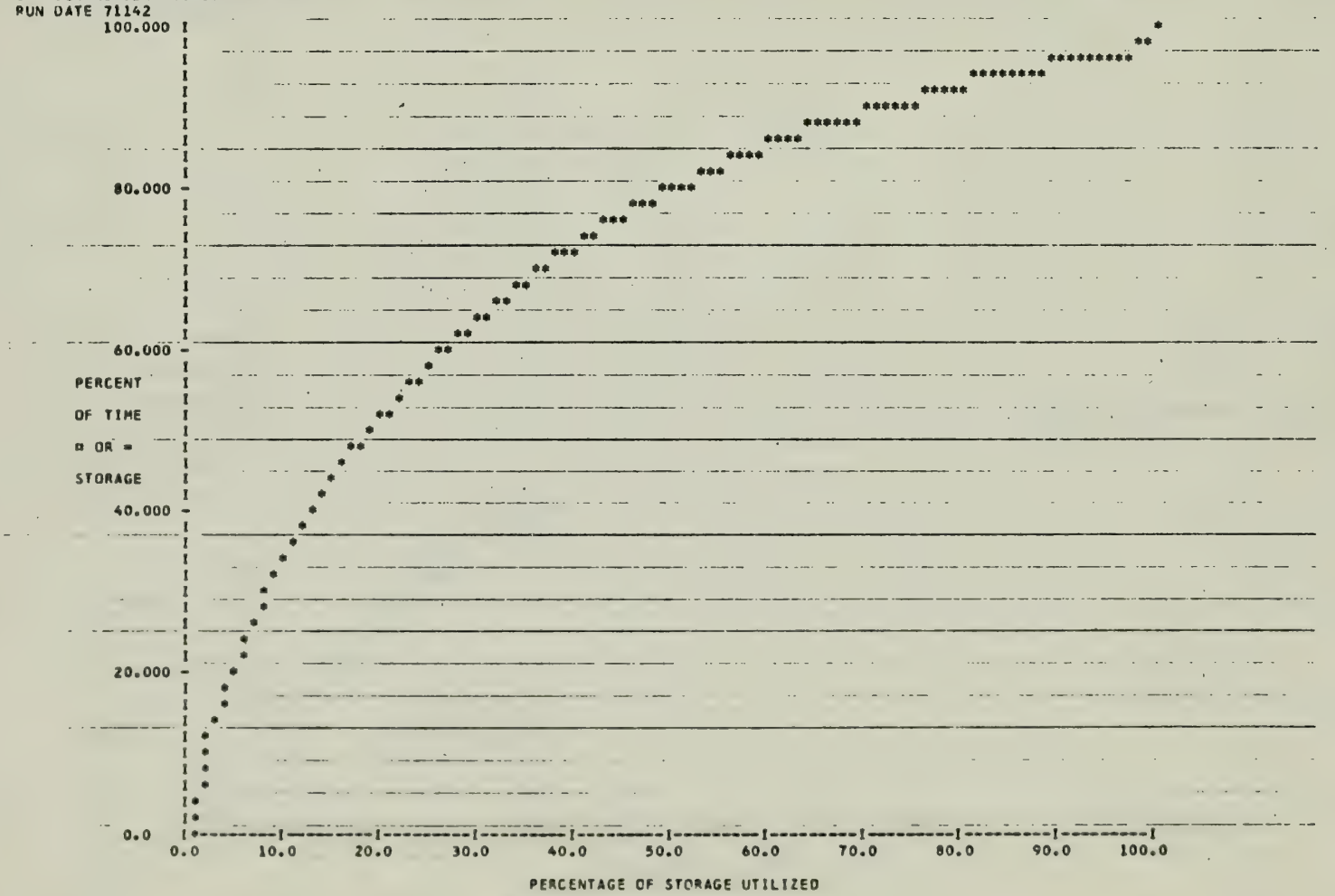


PLATE 99

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

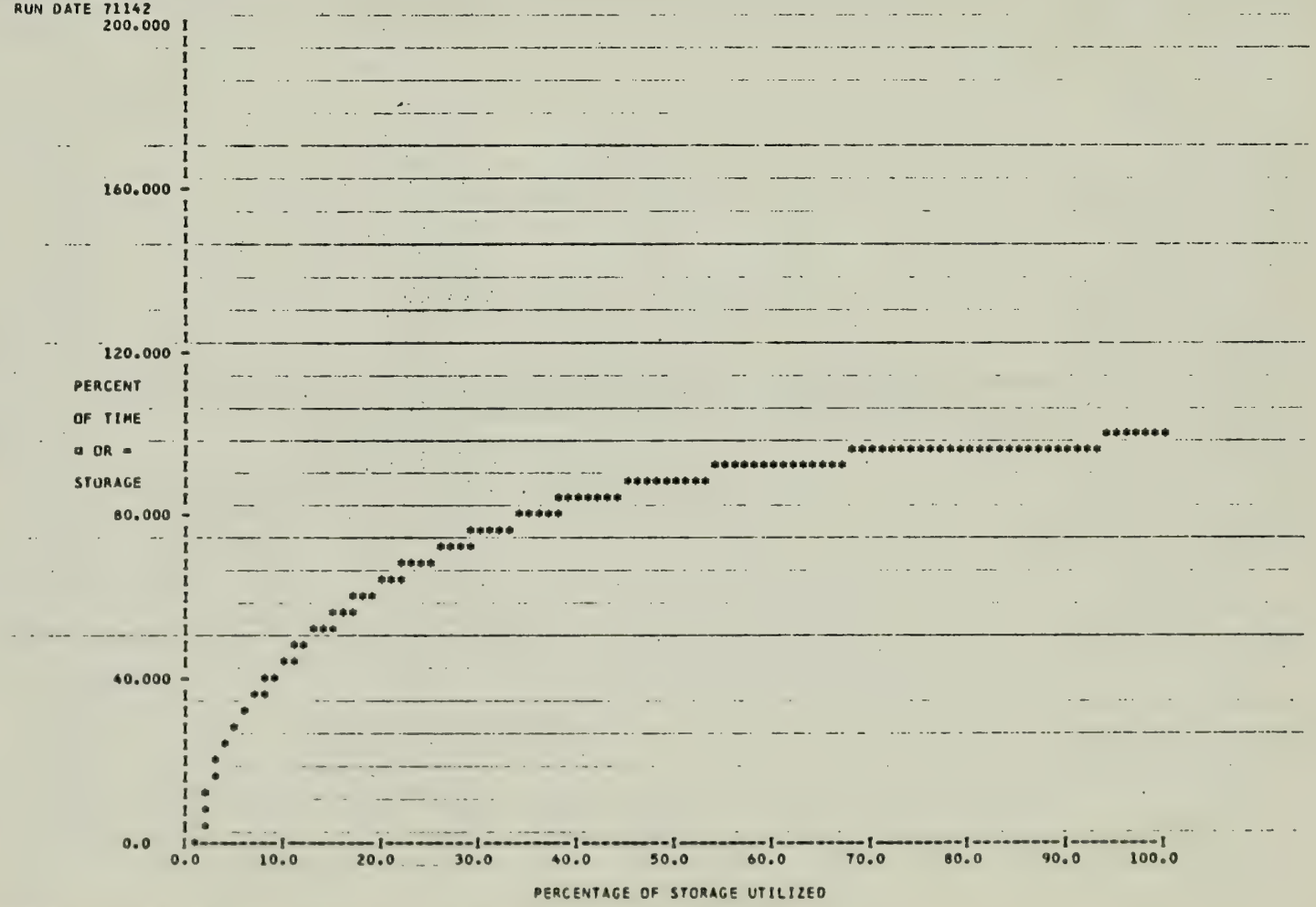


PLATE 100

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

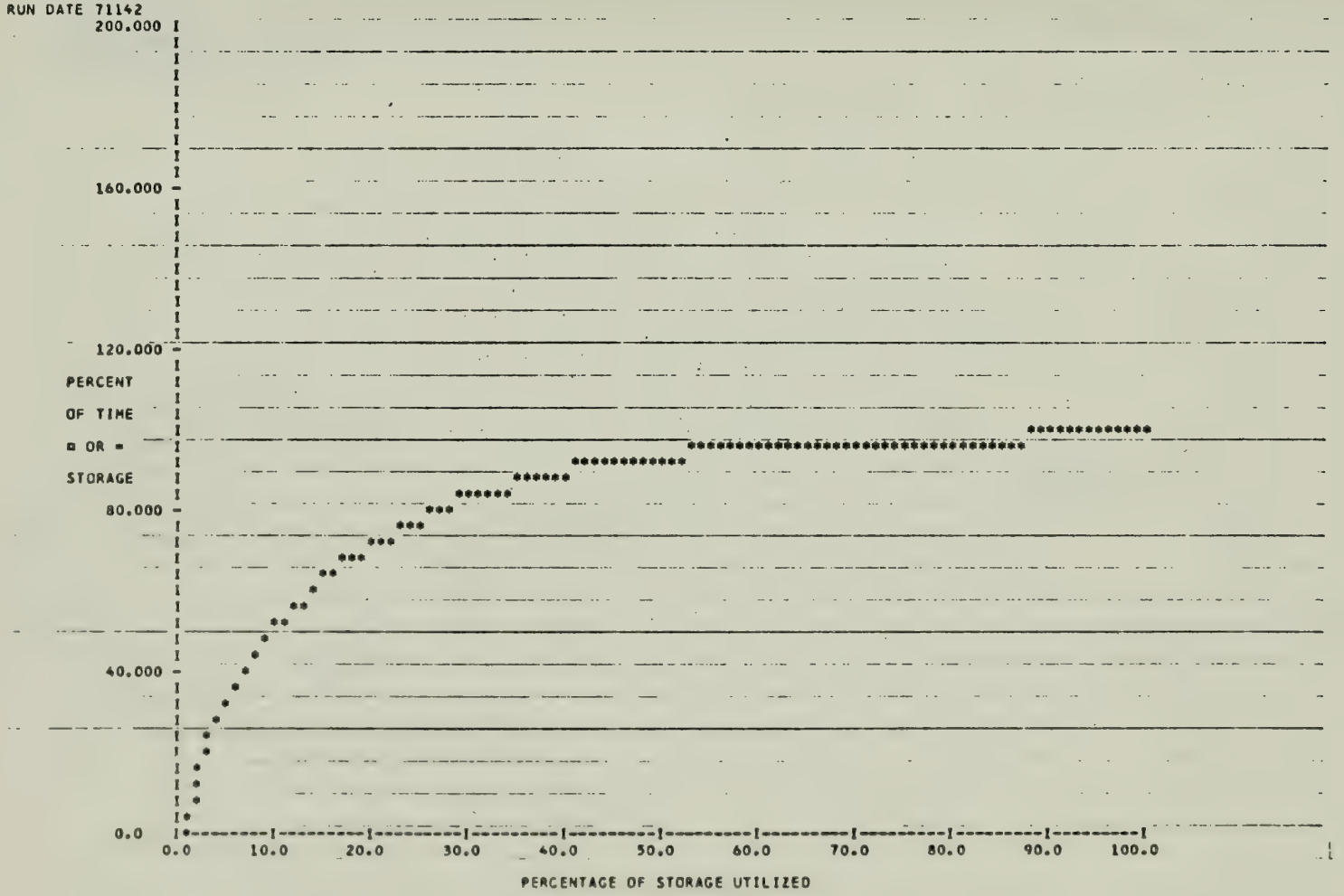


PLATE 101

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 250 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

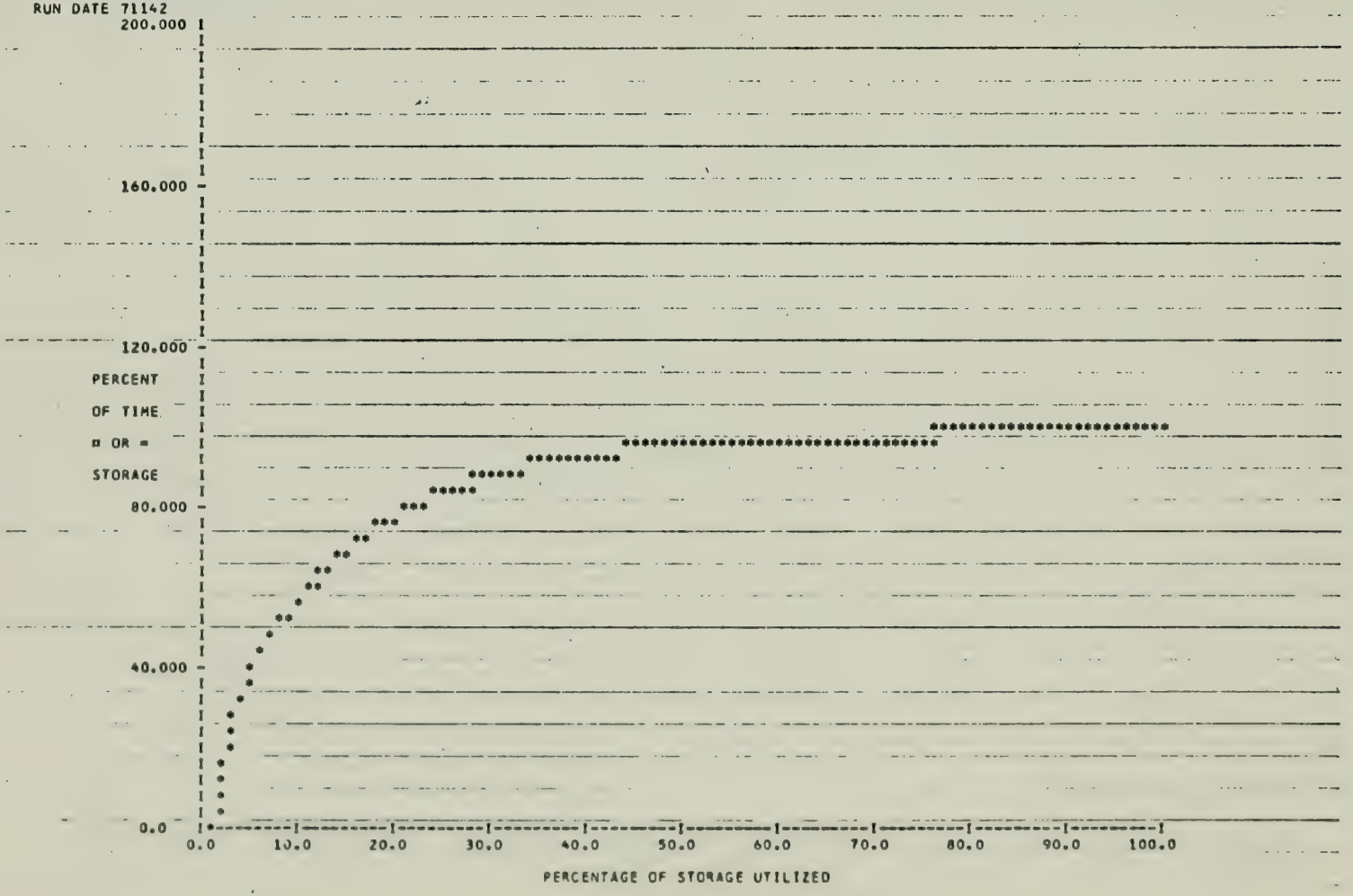


PLATE 102

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 4 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

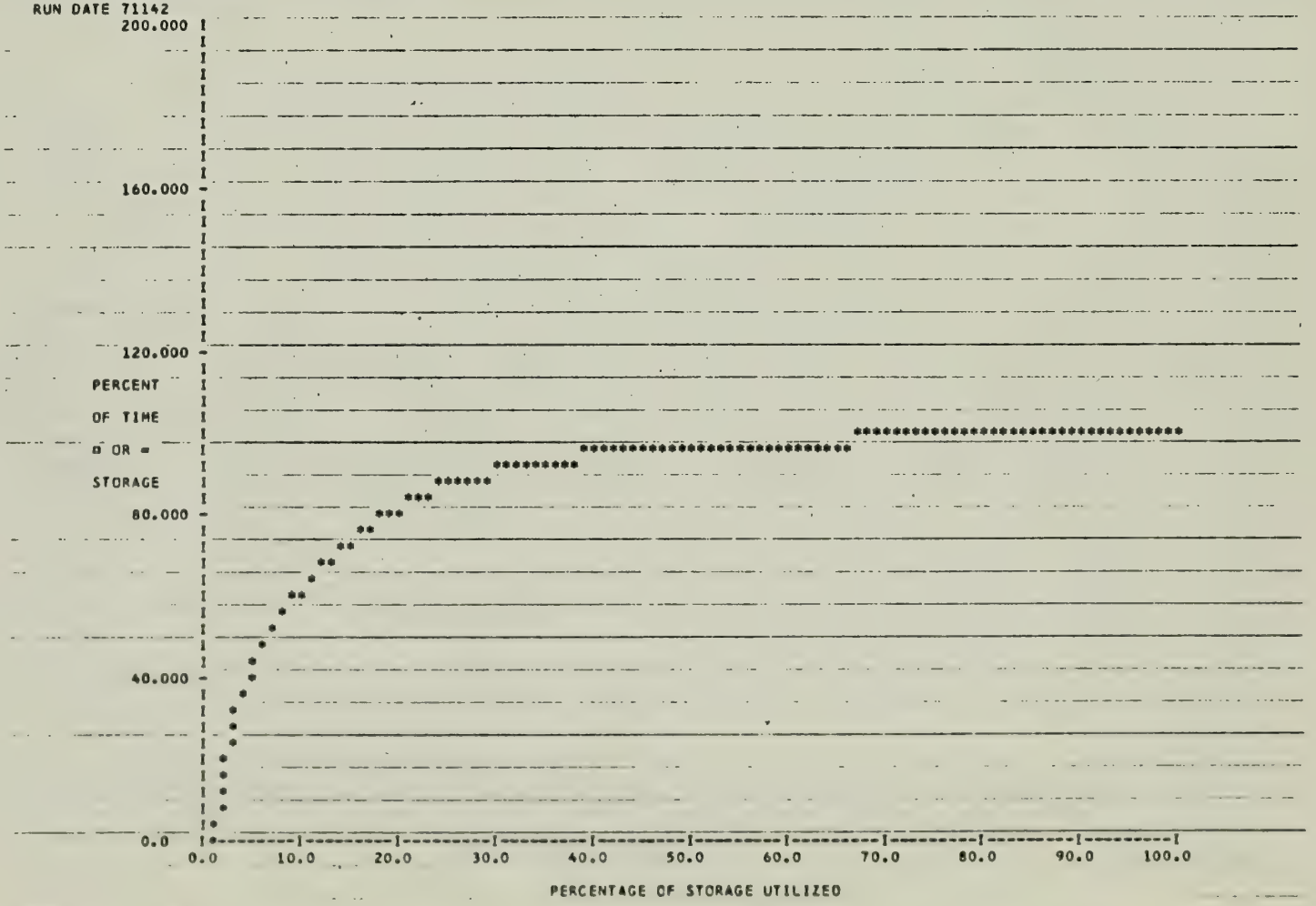


PLATE 103

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 17
21YR RICHMOND-47767

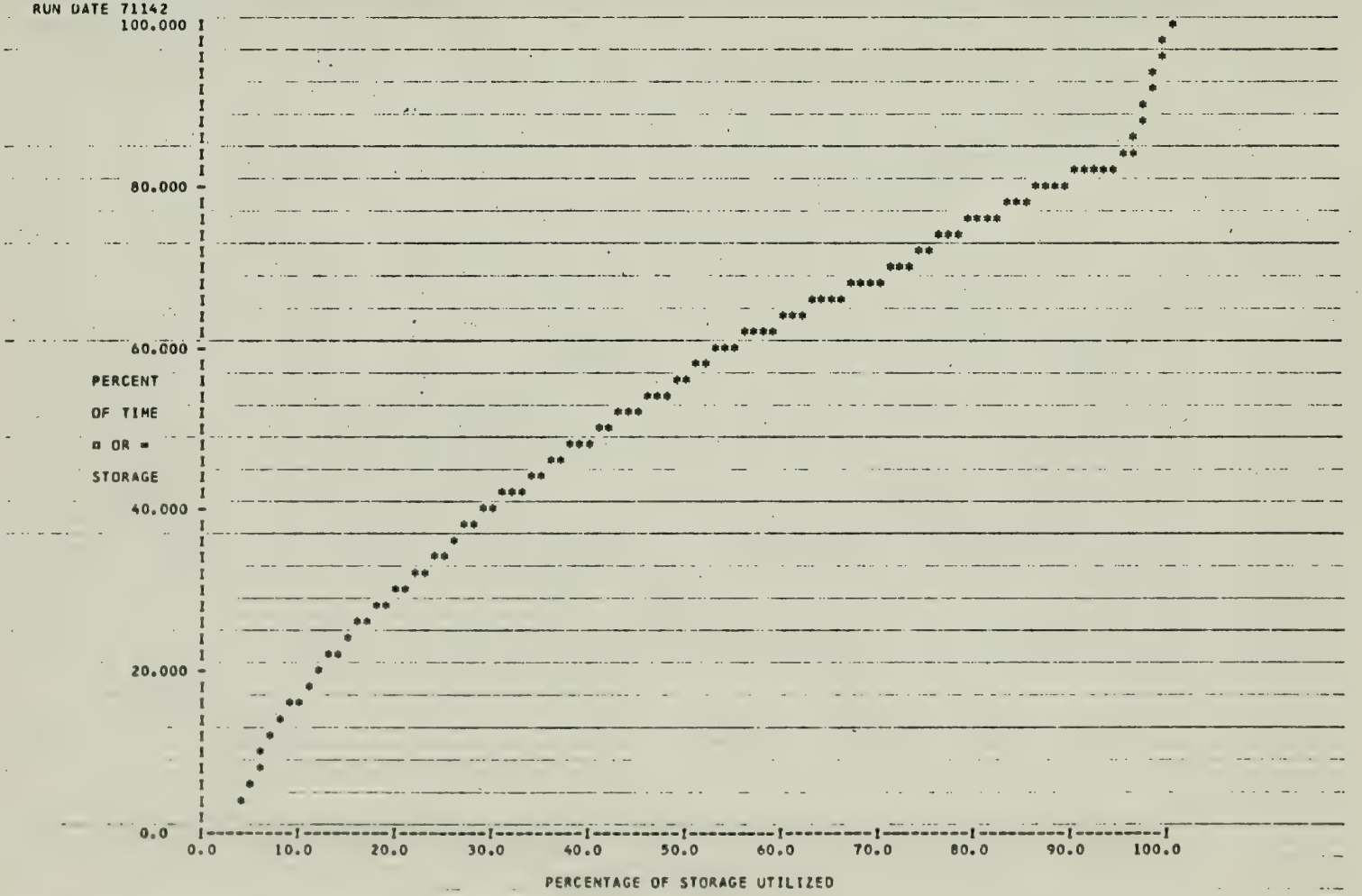


PLATE 104

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

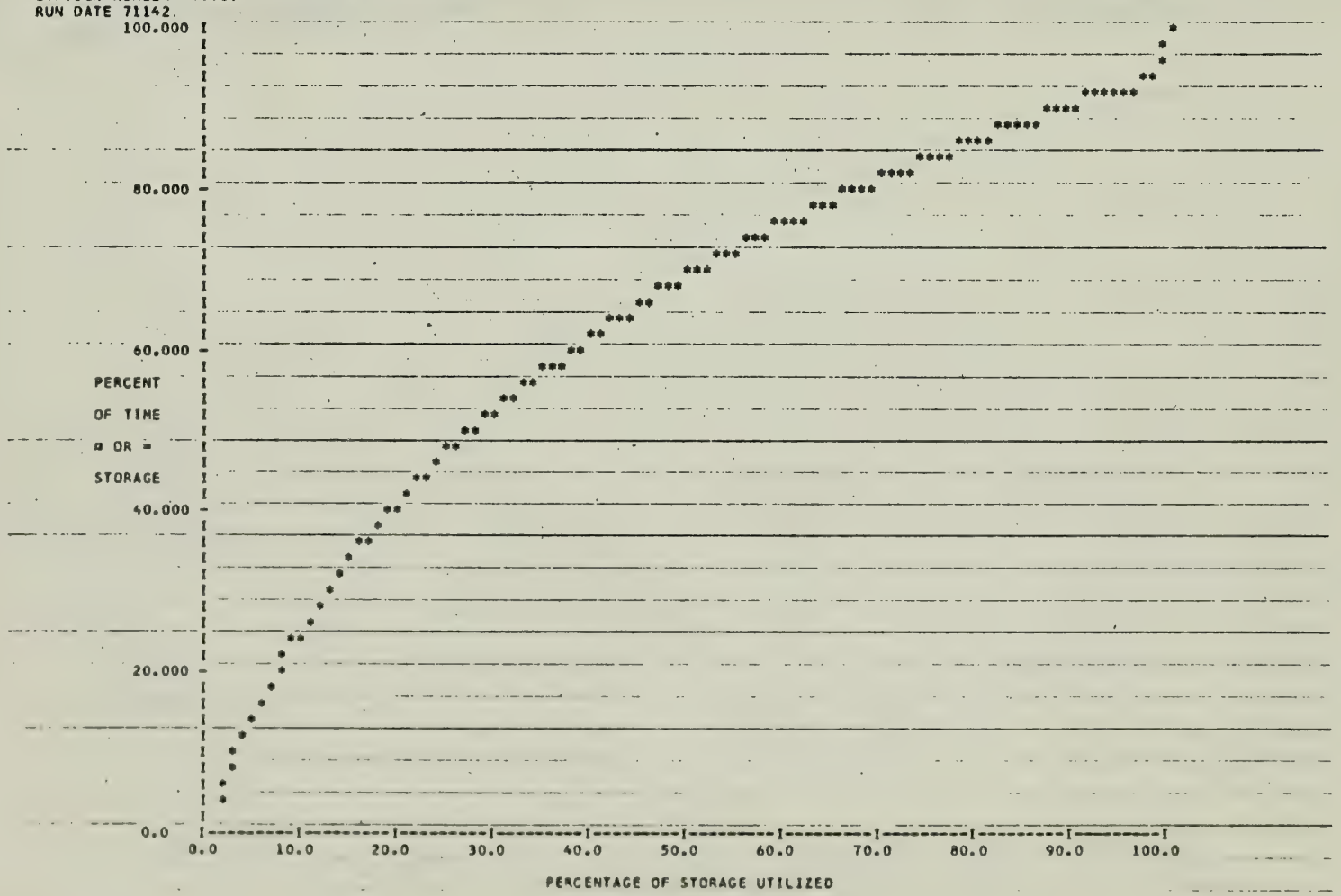


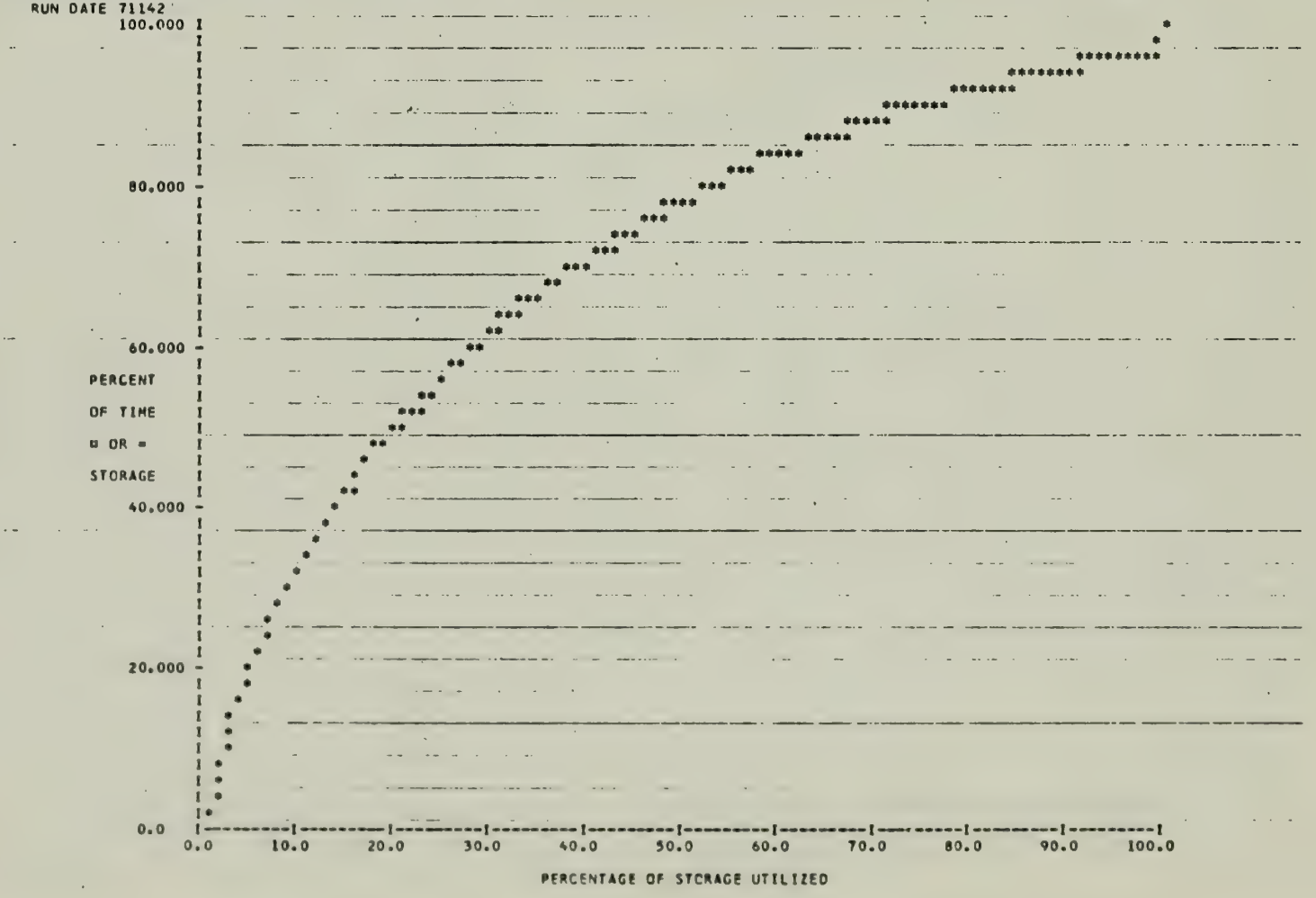
PLATE 105

PLATE 106

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 16
21YR RICHMOND-47767



SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 16
21YR RICHMOND-47767

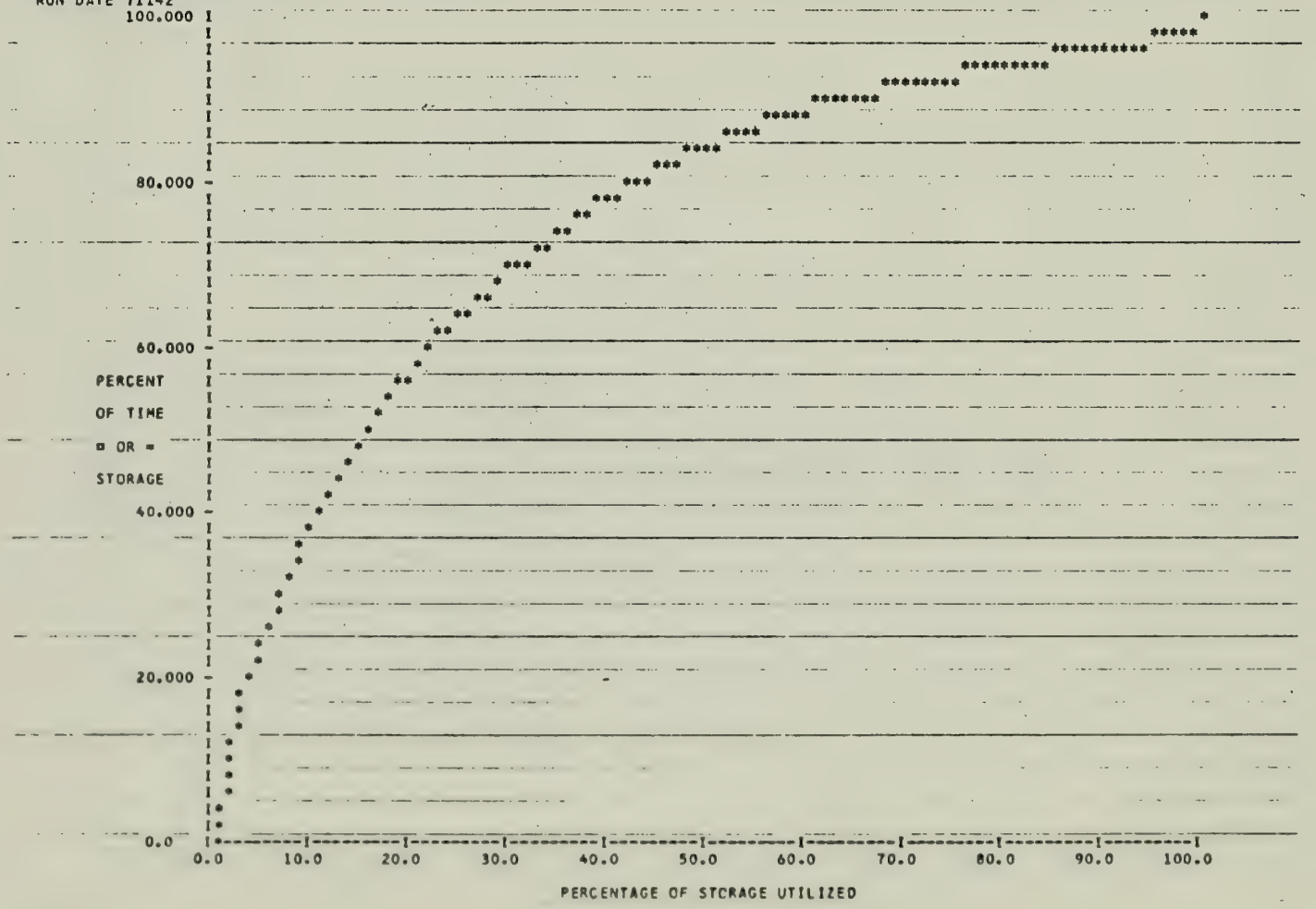


PLATE 107

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

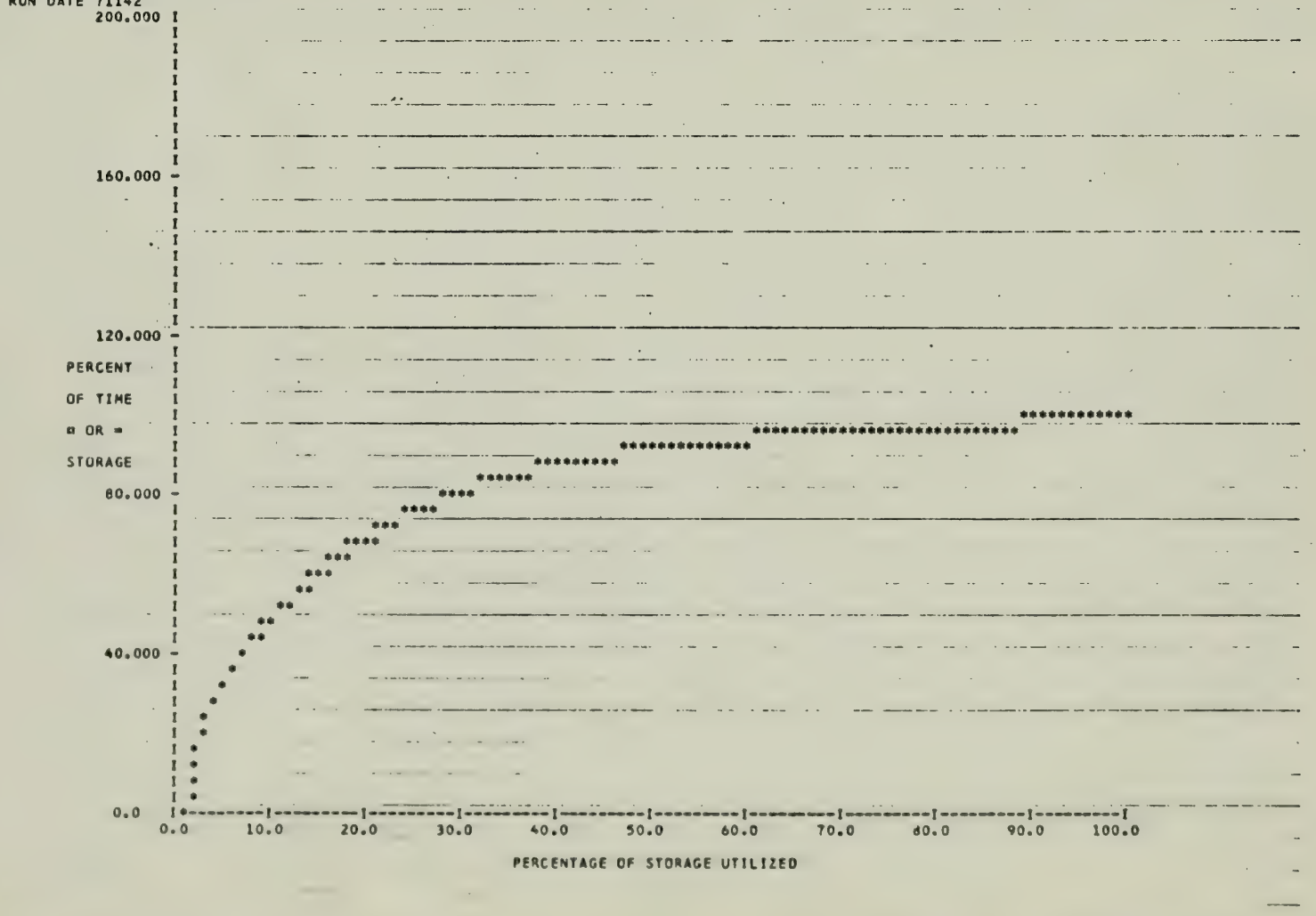


PLATE 108

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

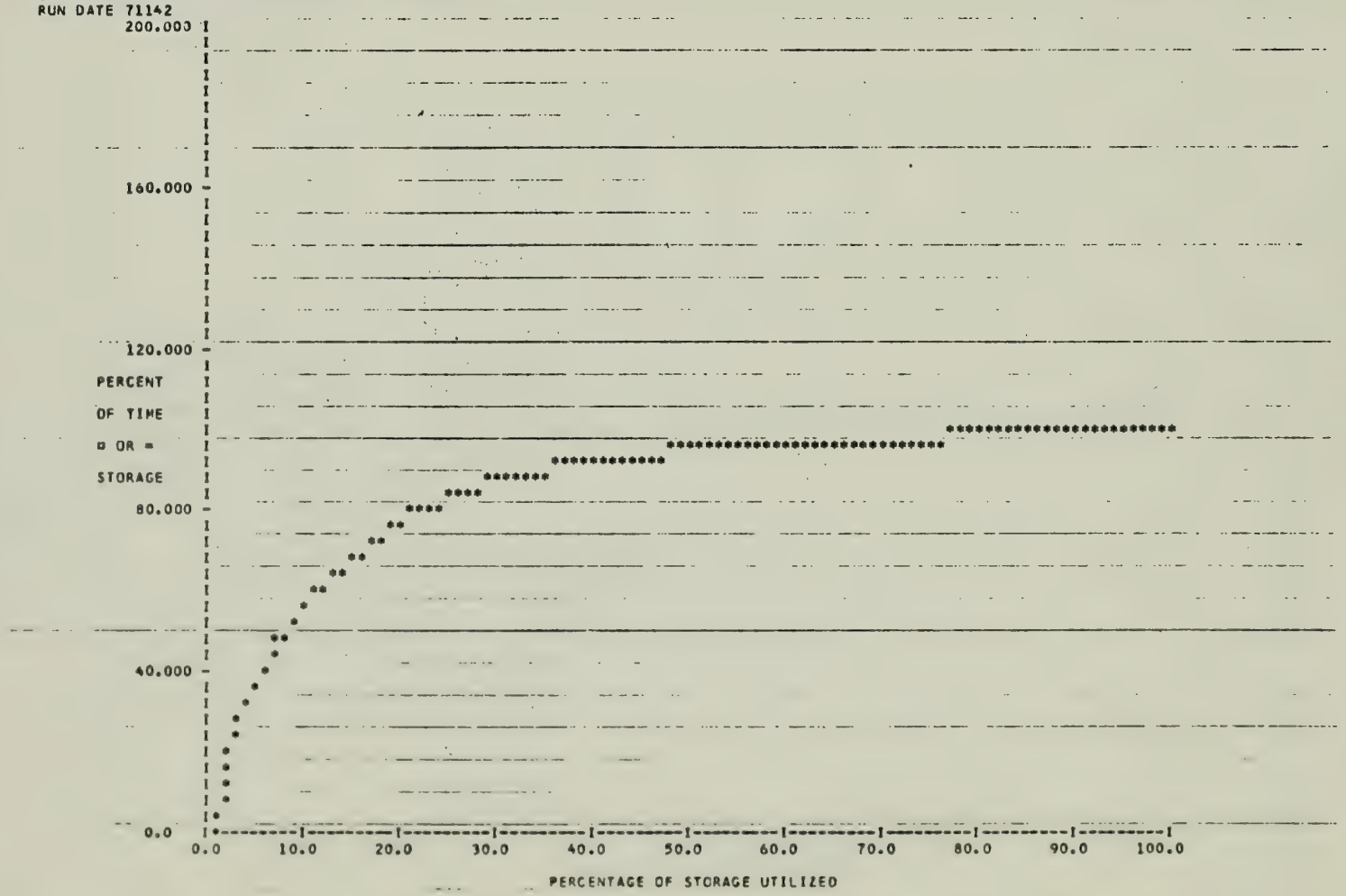


PLATE 109

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 6 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 300 HUNDRETHS OF AN INCH.
STATICN NUMBER 47767
RUN DATE 71142

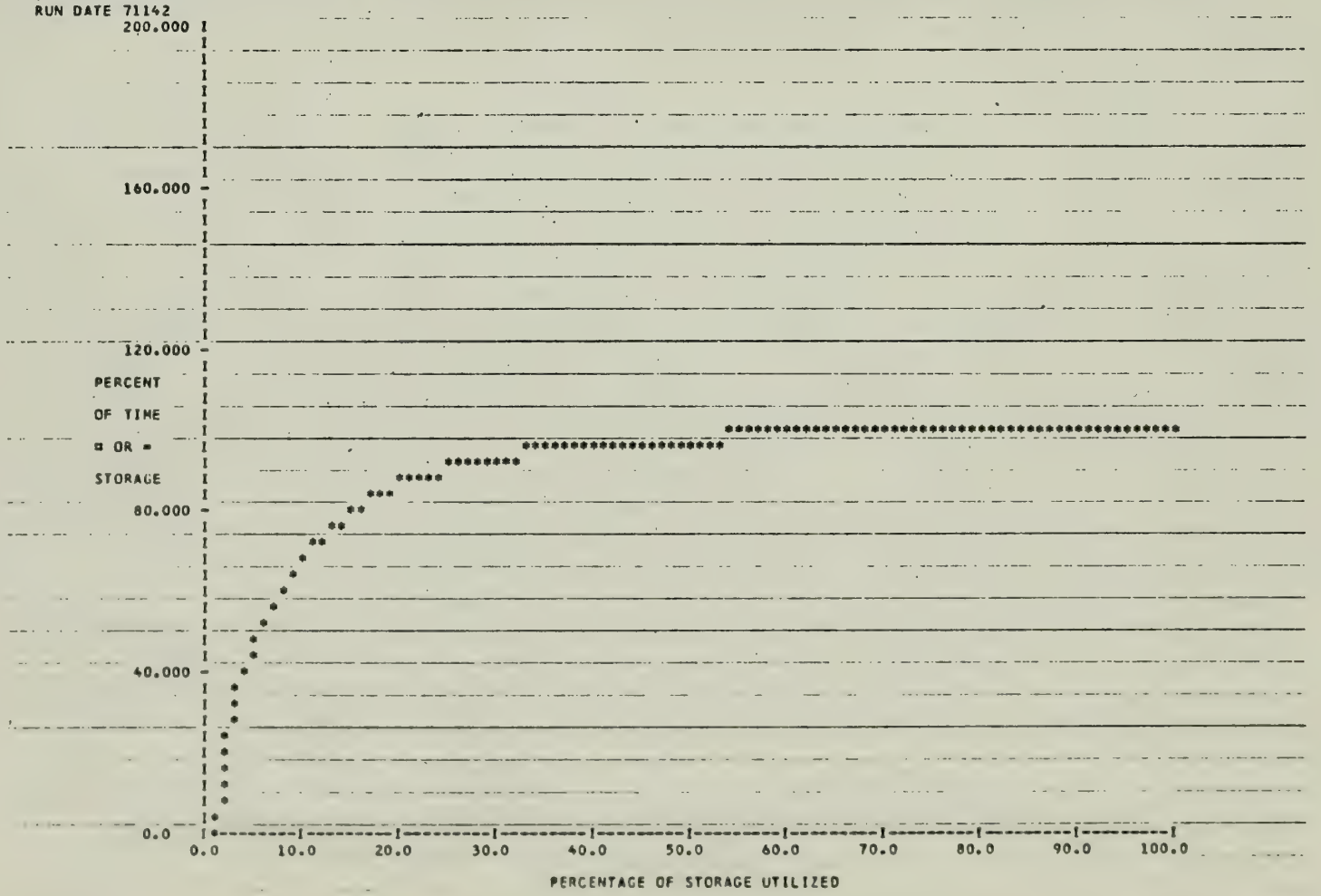


PLATE 110

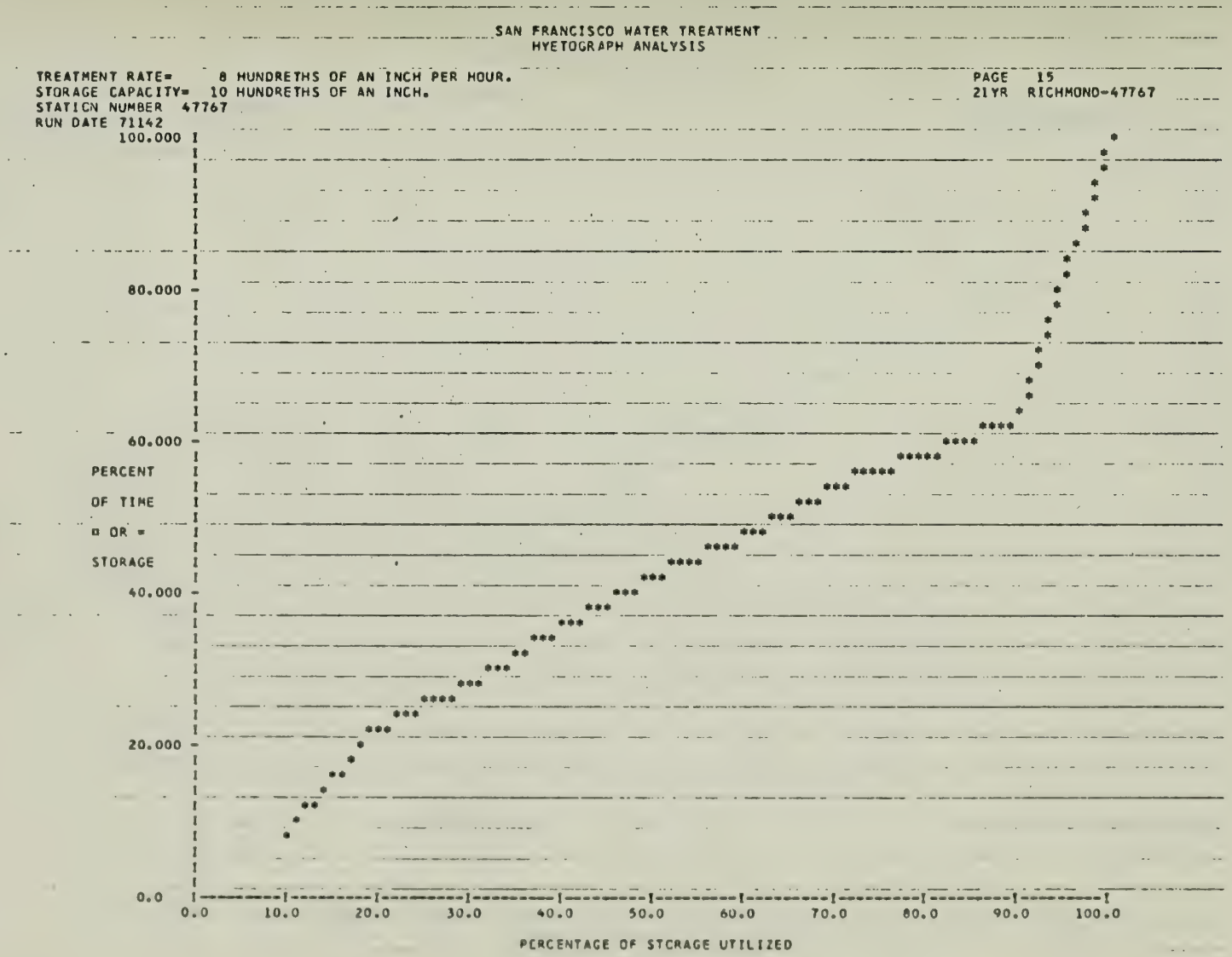

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 15
21YR RICHMOND-47767
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
¤ OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE III

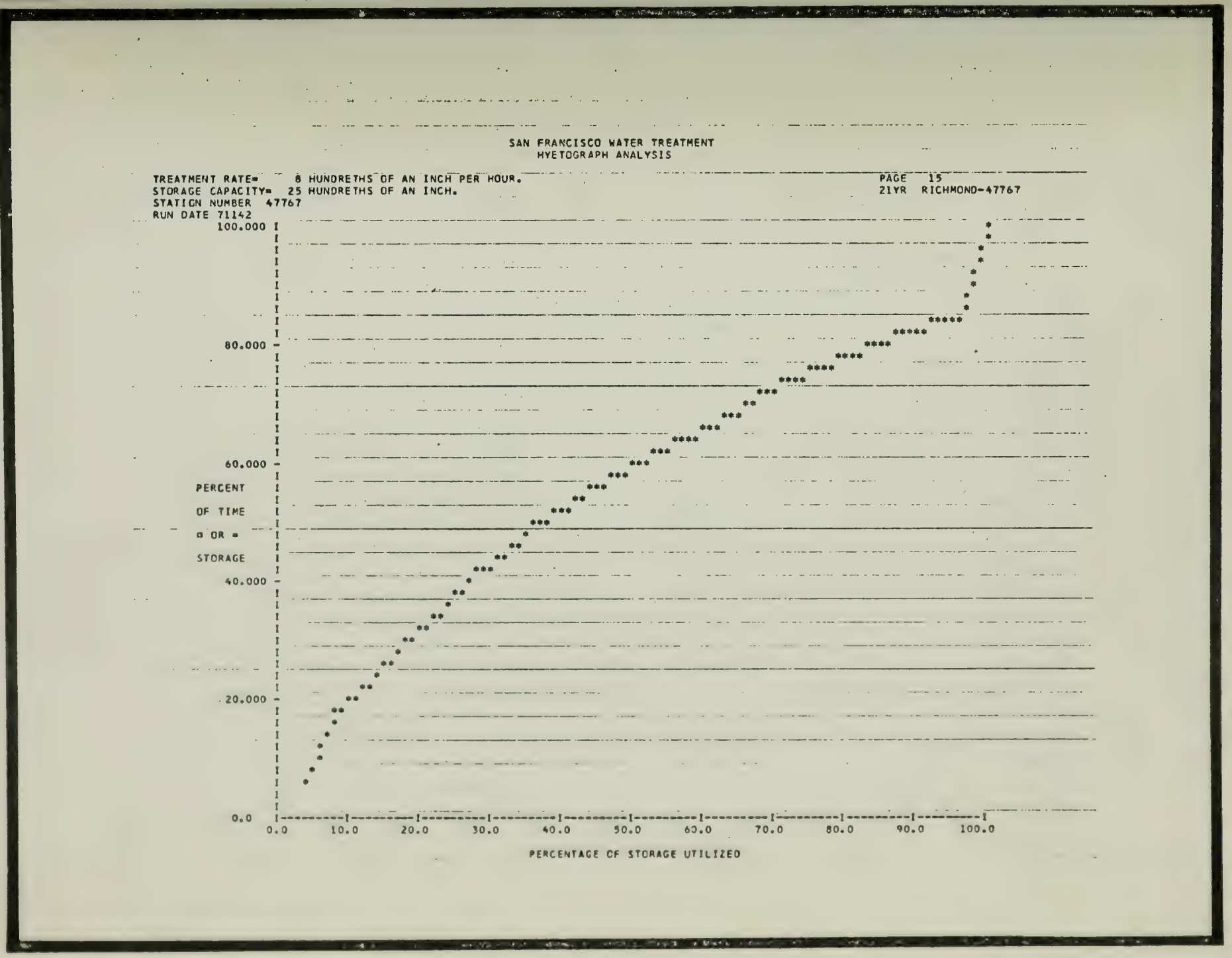

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 15
21YR RICHMOND-47767
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
□ OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 112

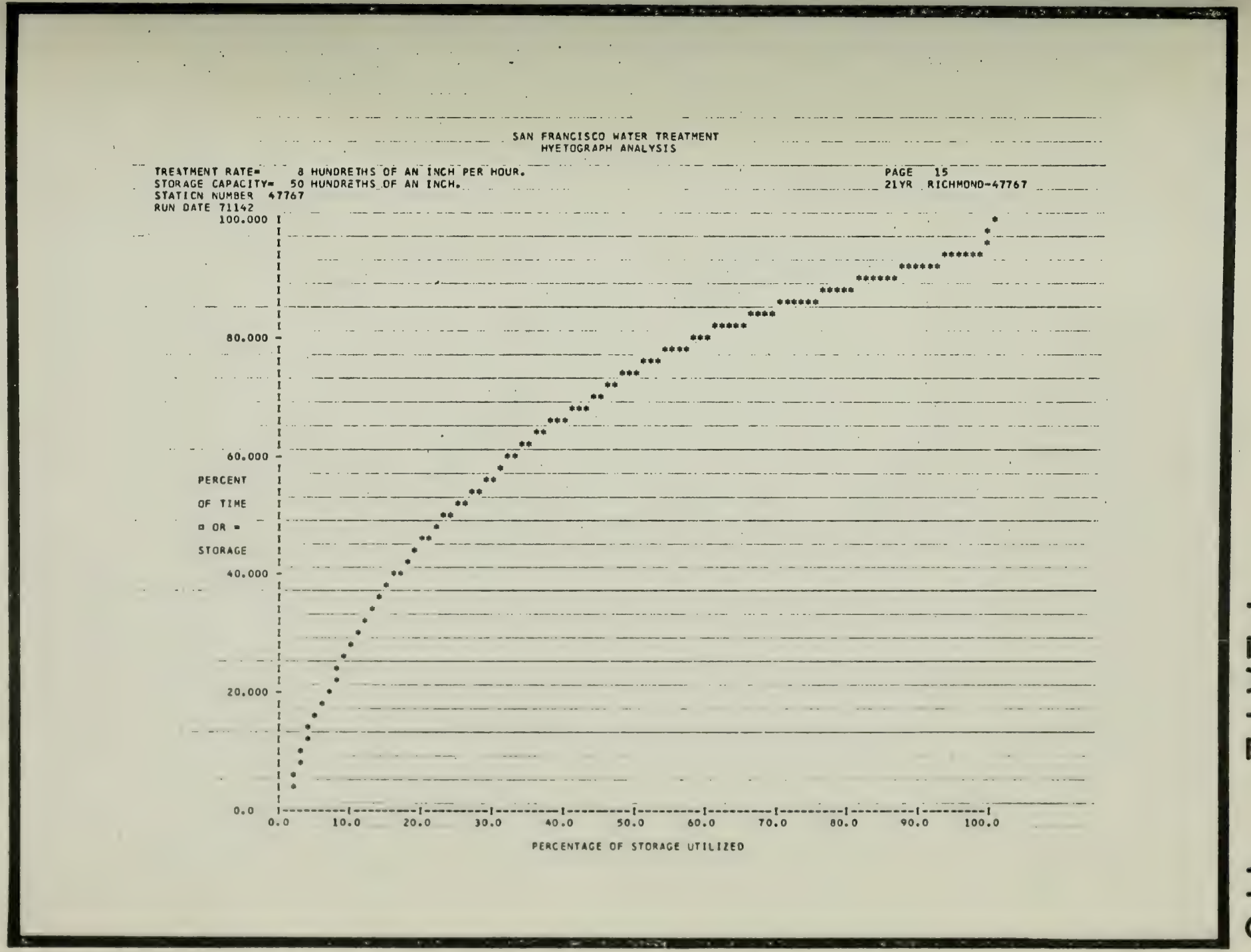

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 15
21YR RICHMOND-47767
100.000
80.000
60.000
PERCENT
OF TIME
□ OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 113

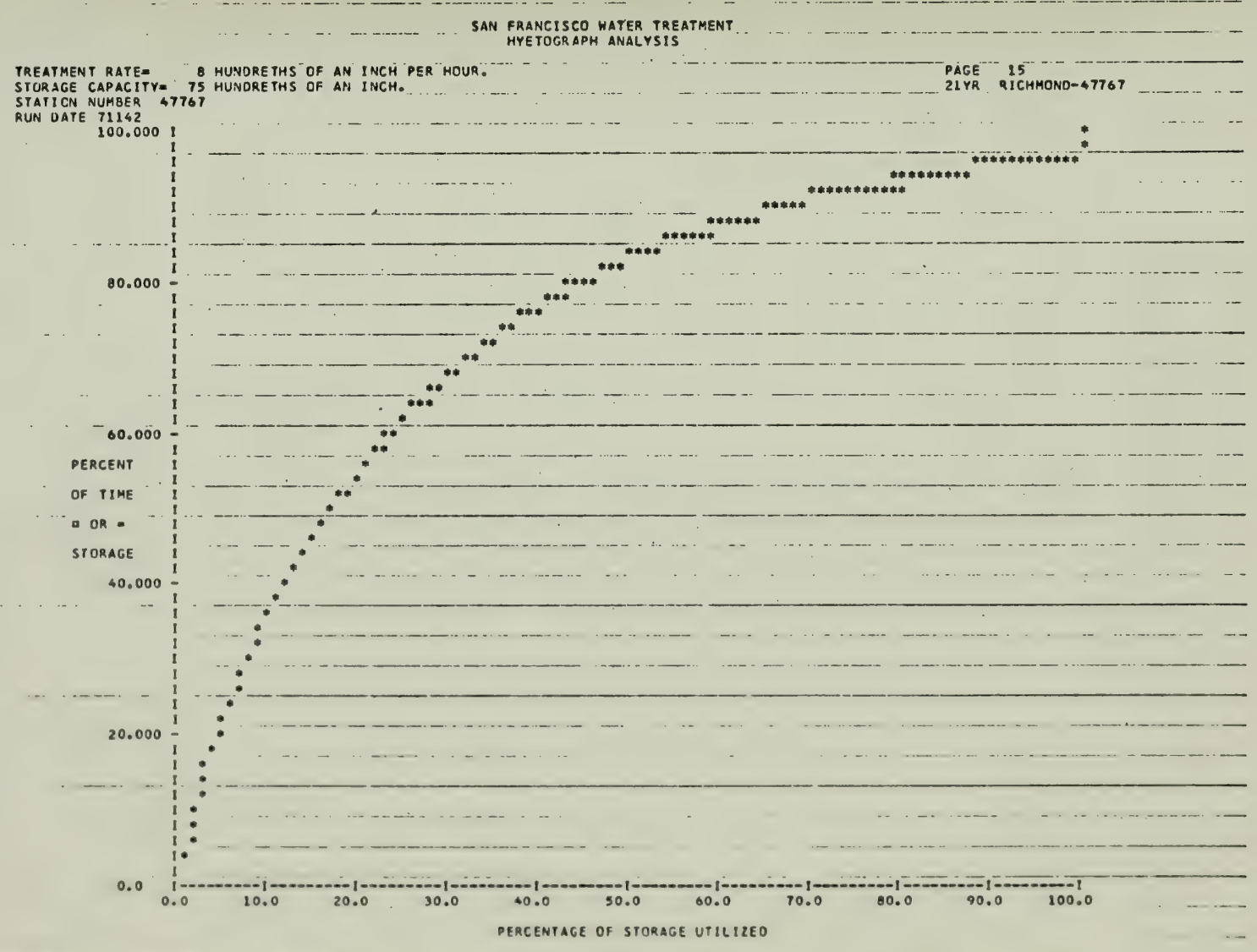

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 15
21YR RICHMOND-47767
100.000
80.000
60.000
PERCENT
OF TIME
= OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 114

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

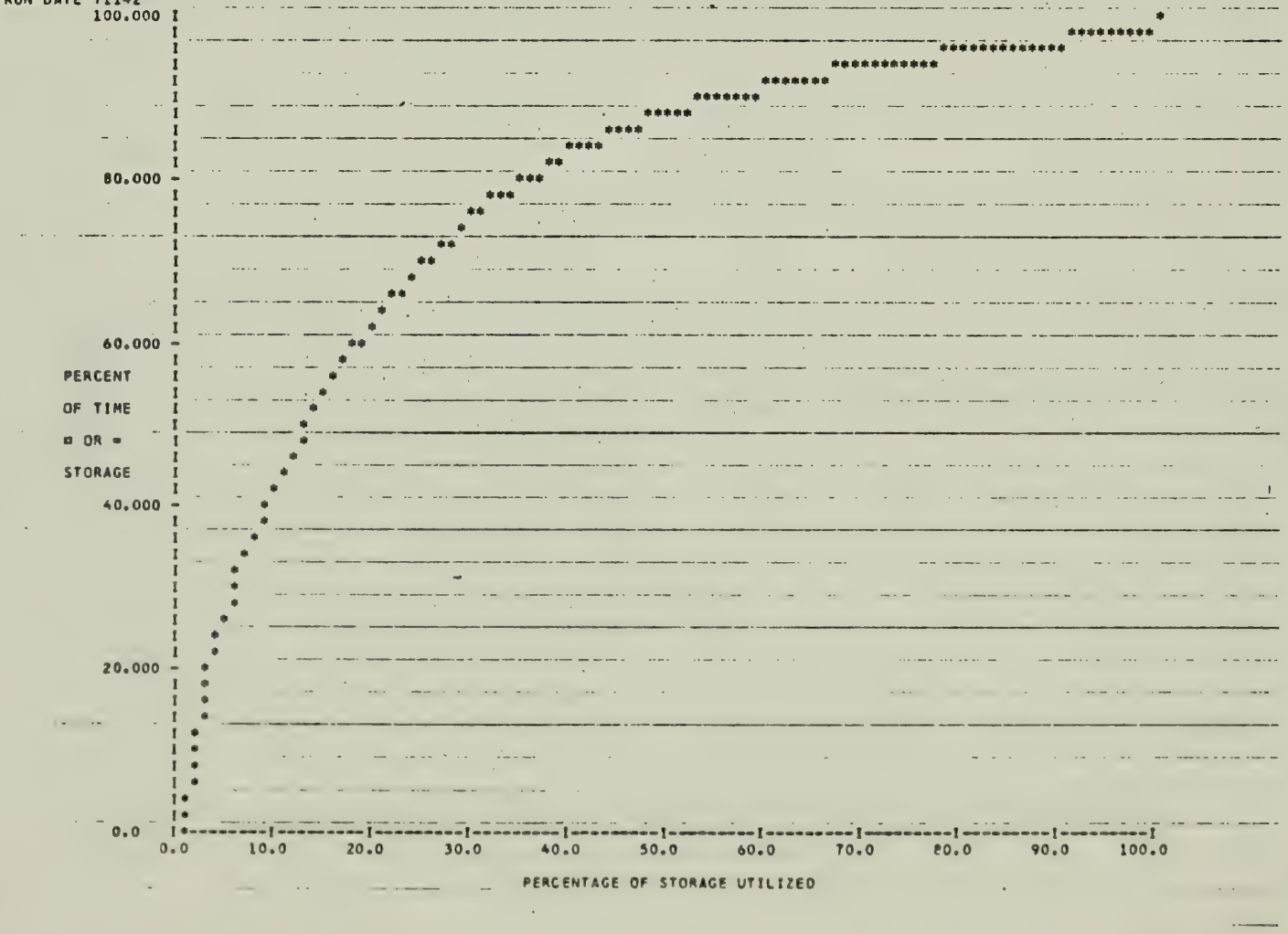


PLATE 115

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 15
21YR RICHMOND-47767

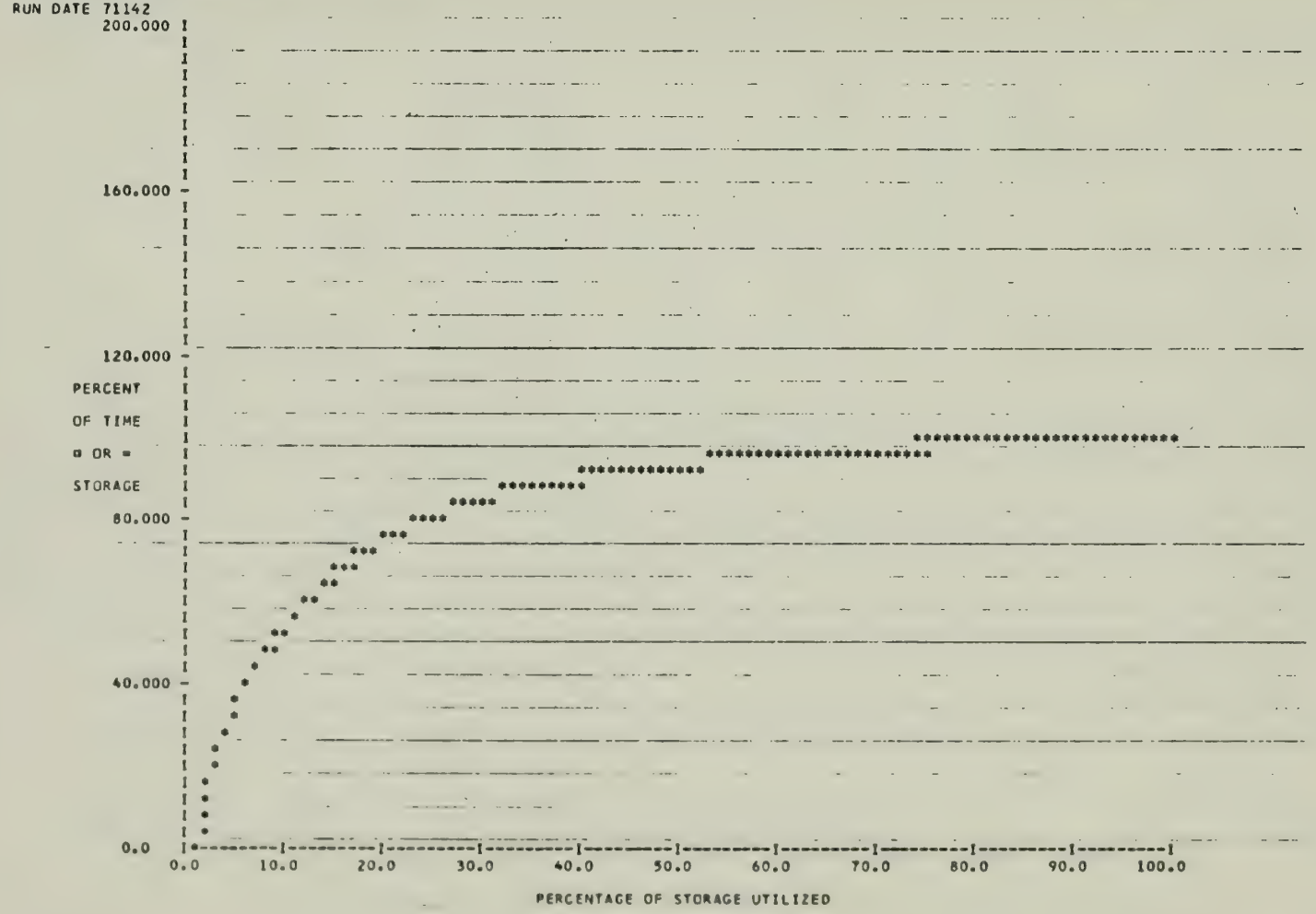


PLATE 116

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 8 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 200 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

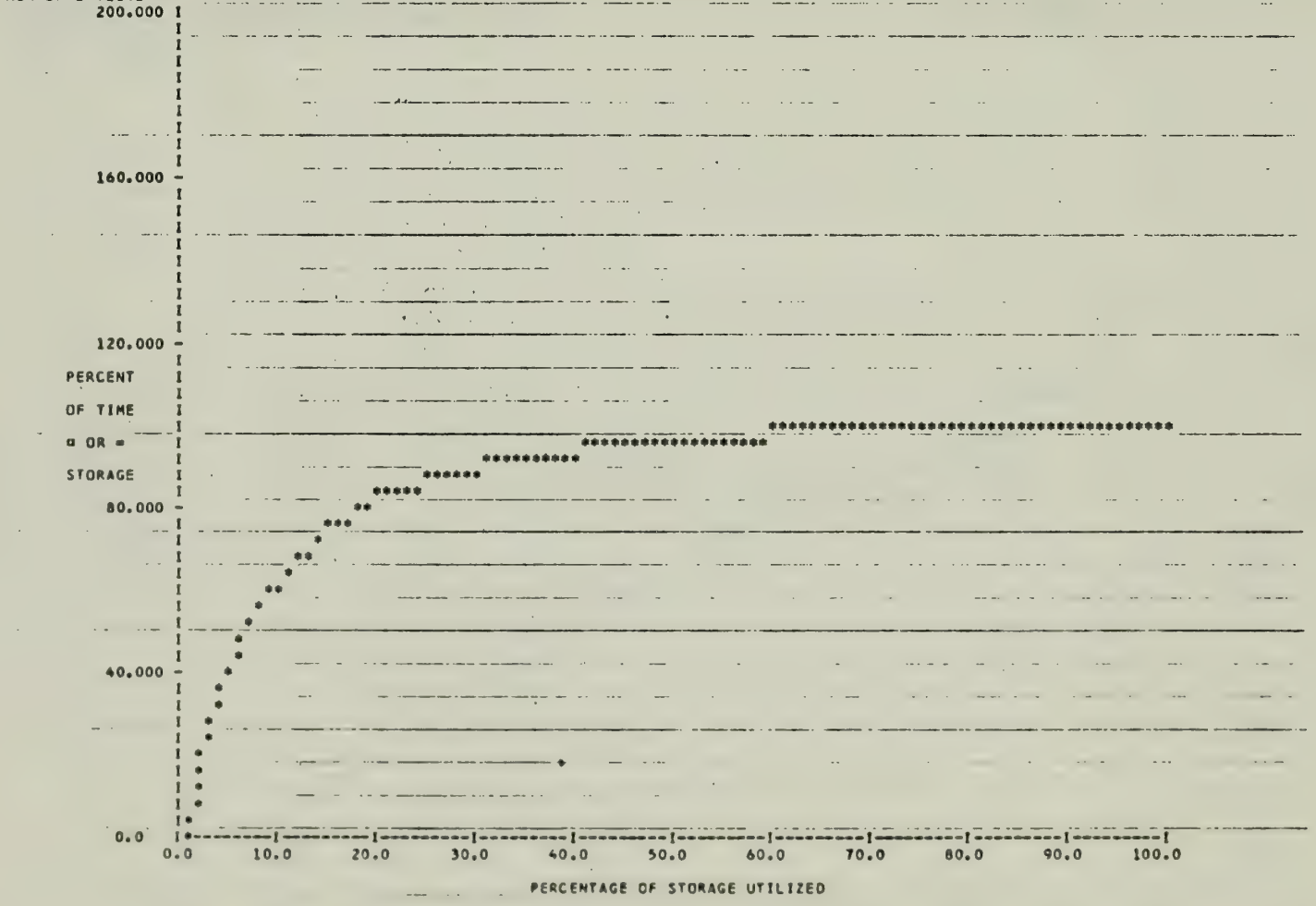


PLATE 117

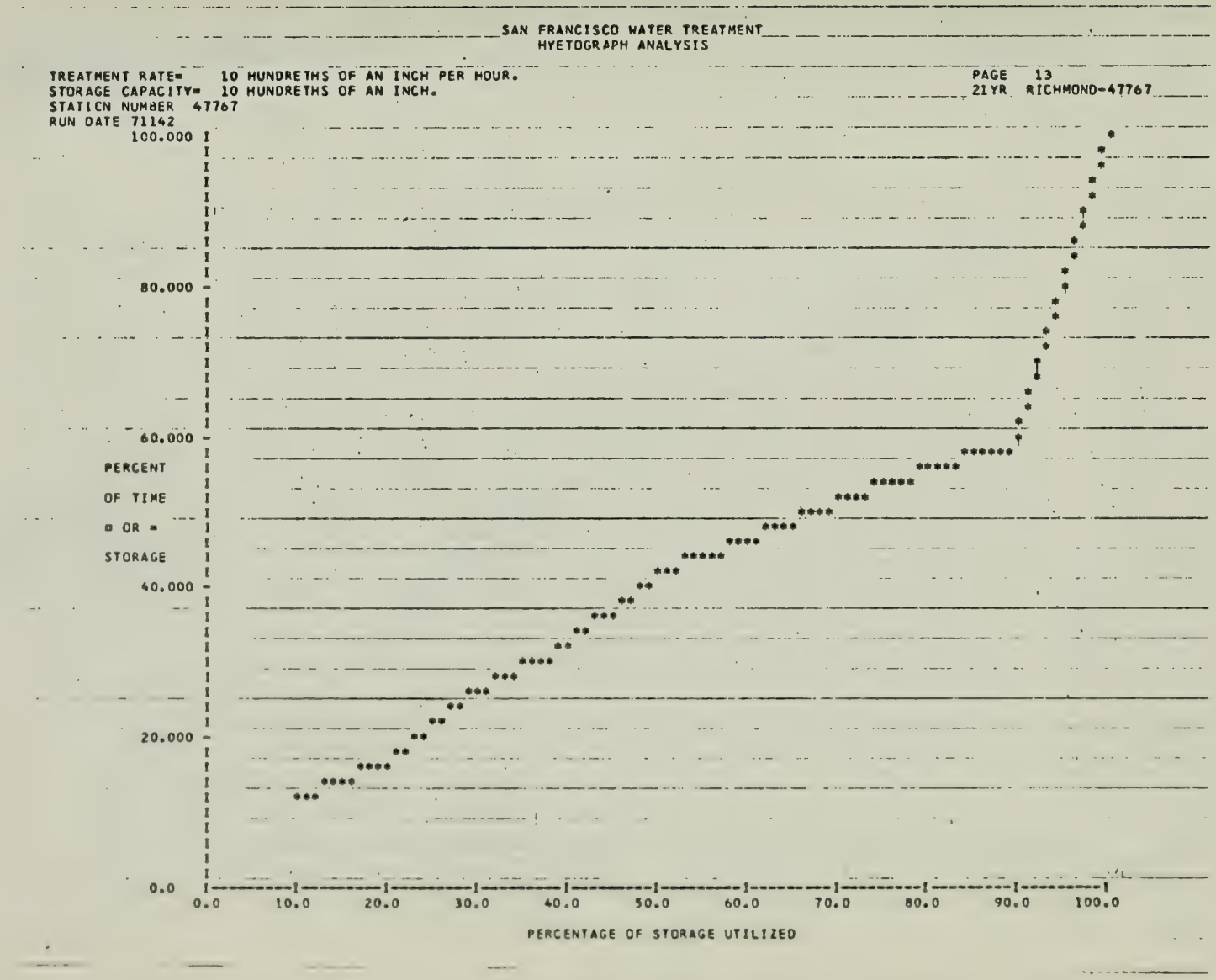

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 10 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 13
21YR RICHMOND-47767
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 118

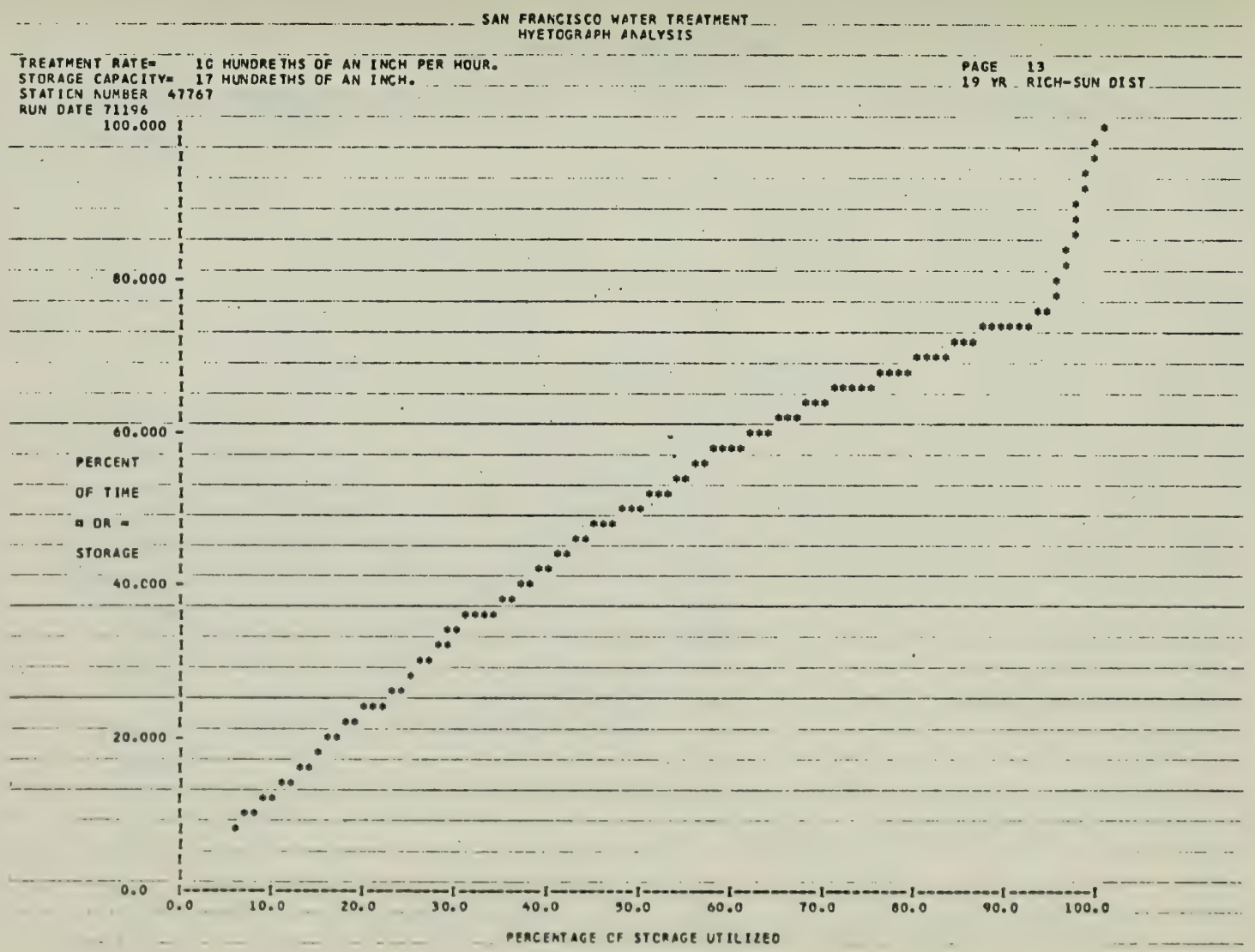

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 17 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71196
PAGE 13
19 YR RICH-SUN DIST
100.000
80.000
60.000
40.000
20.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 119

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 25 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

PAGE 13
21YR RICHMOND-47767

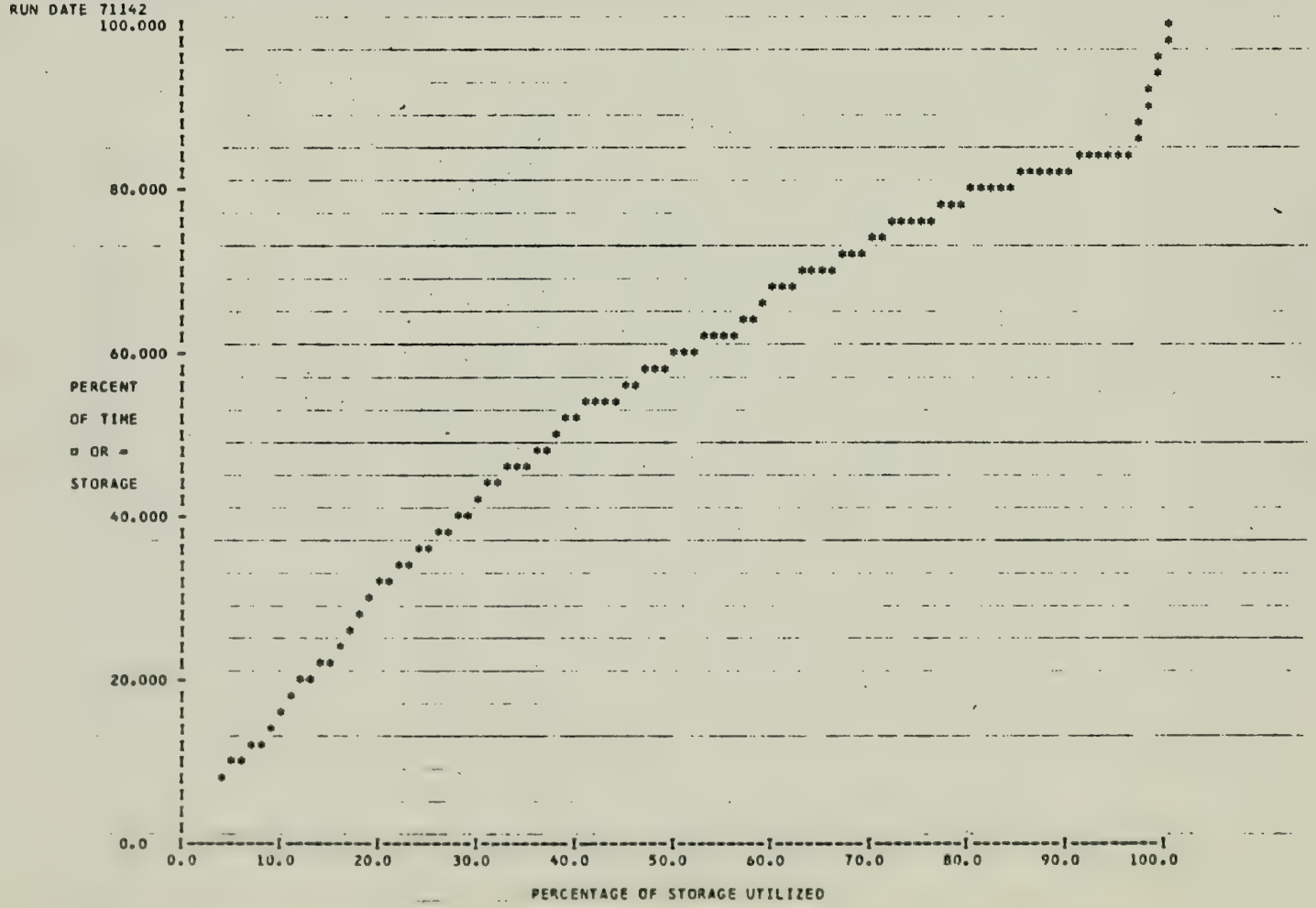


PLATE 120

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 29 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71156

19 YR RICH-SUN DIST

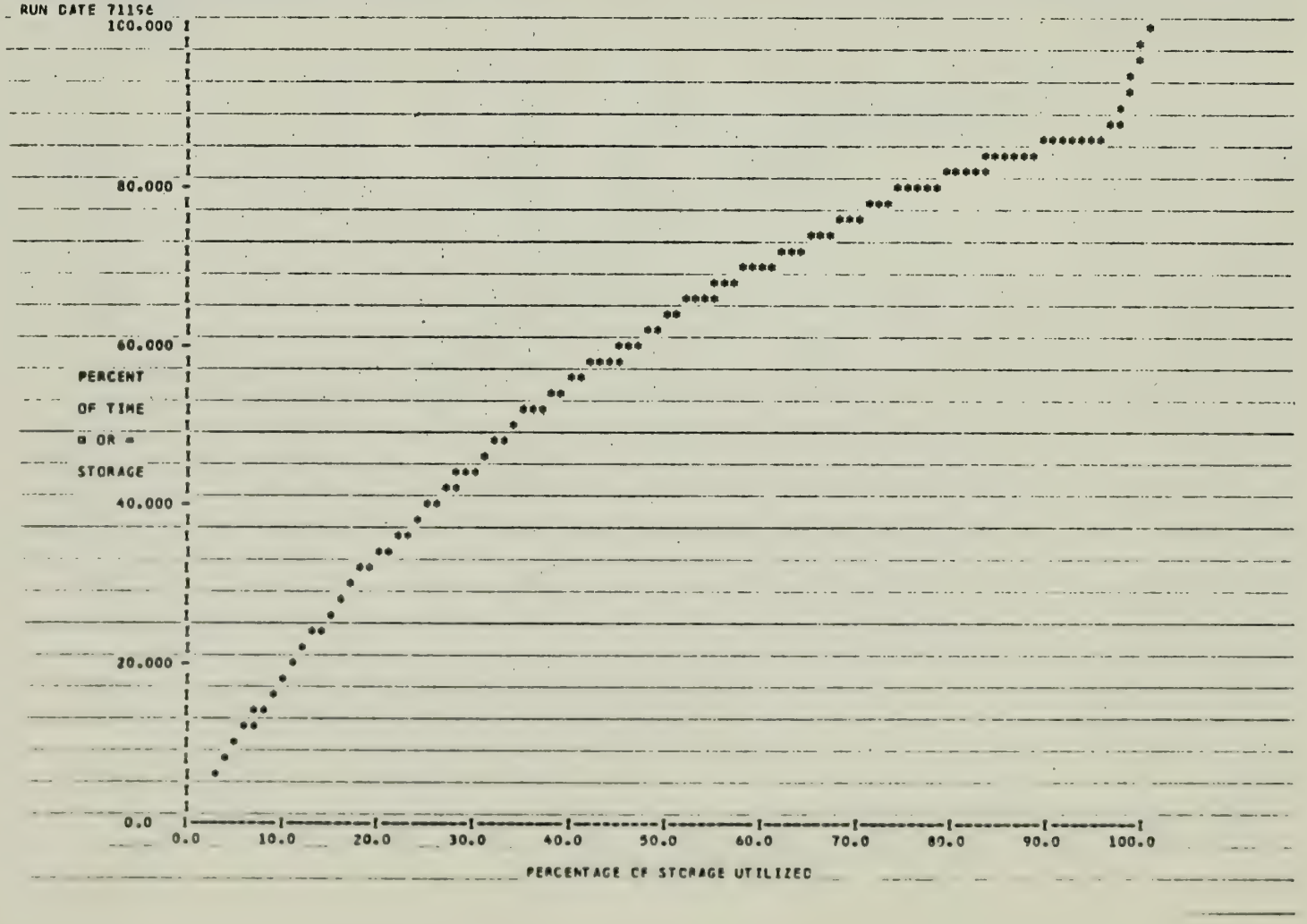


PLATE 121

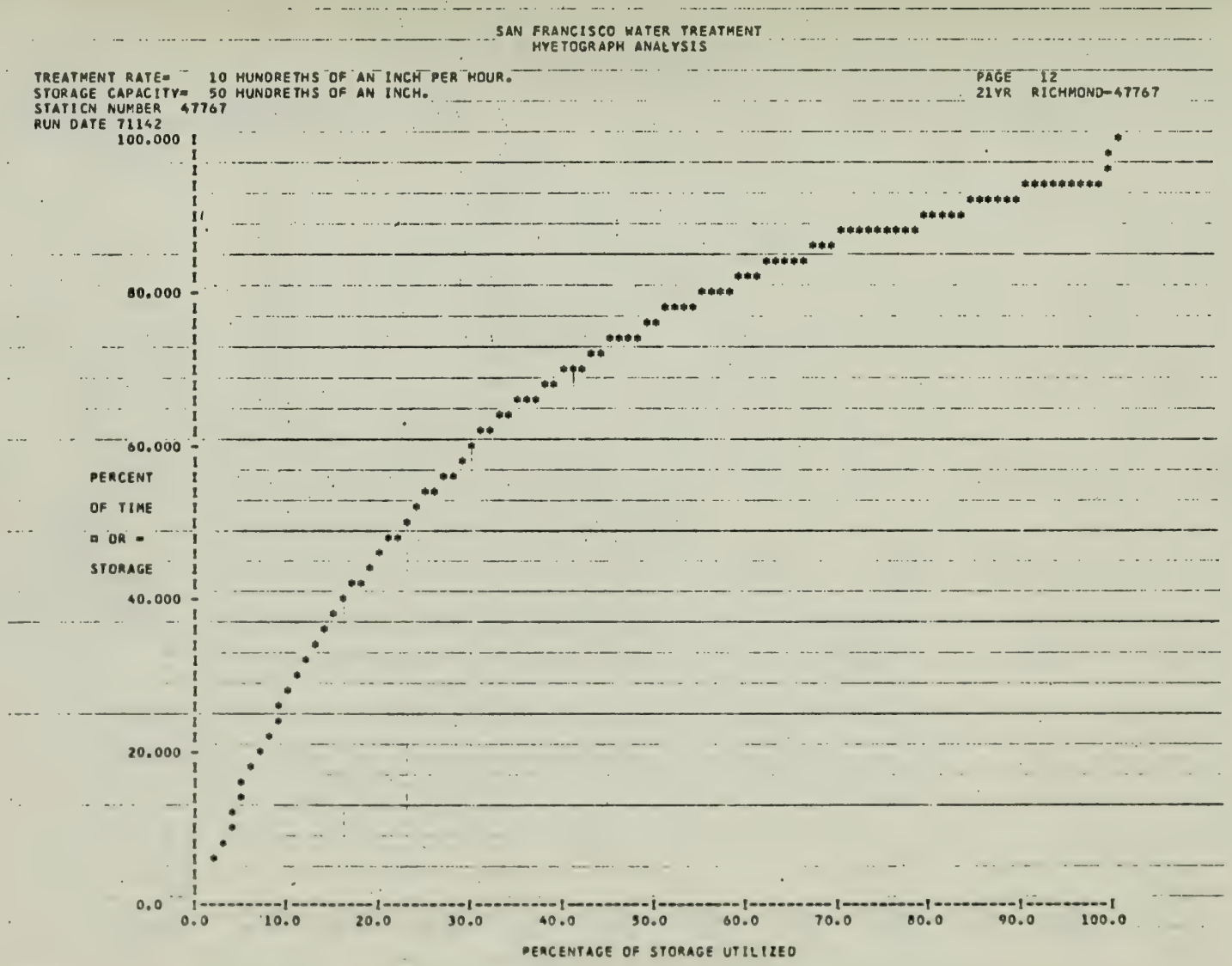

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 50 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 12
21YR RICHMOND-47767
100.000
80.000
60.000
PERCENT
OF TIME
= OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 122

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 60 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71196

19 YR RICH-SUN DIST

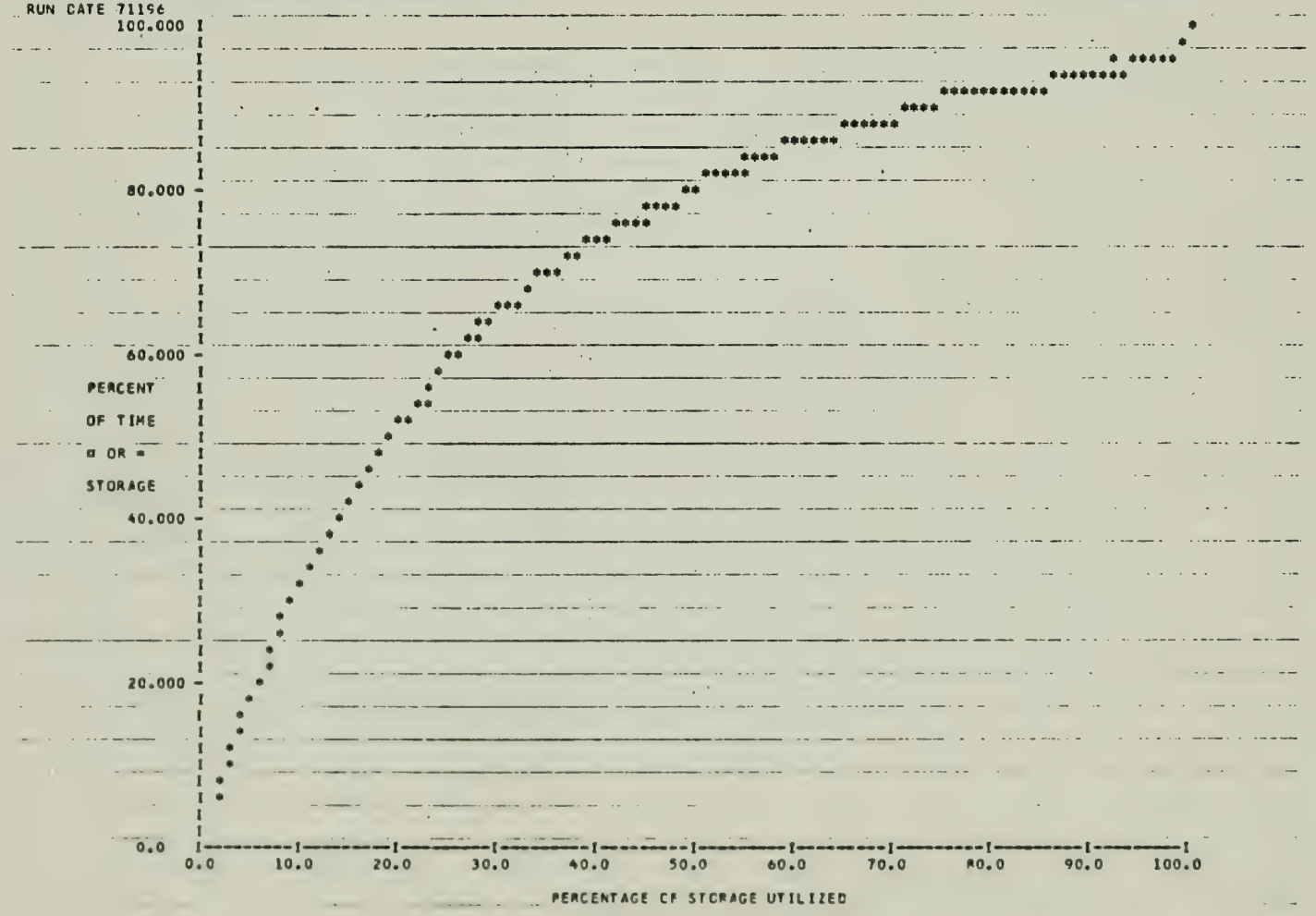


PLATE 123

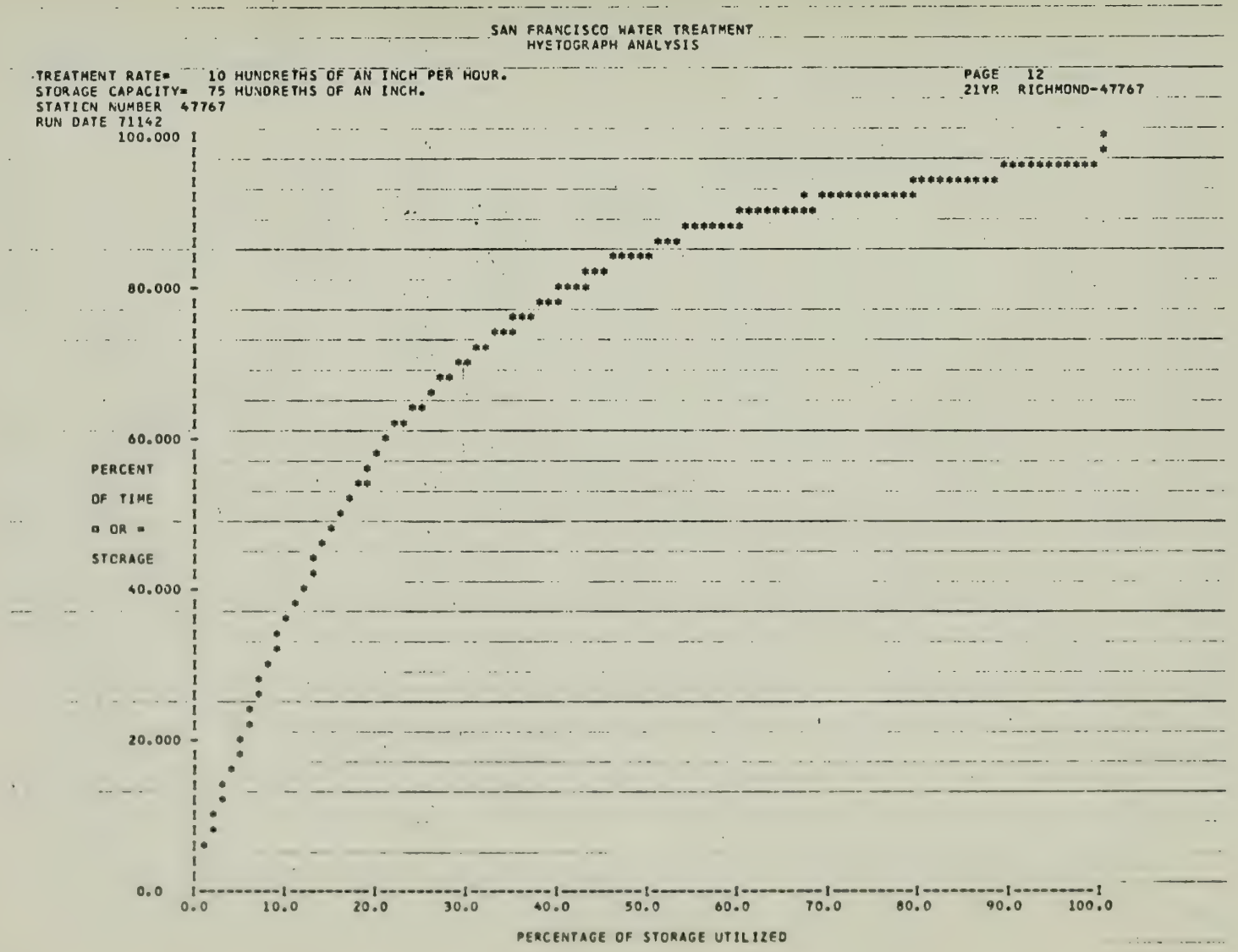

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 75 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 12
21YR RICHMOND-47767
100.000
80.000
60.000
PERCENT
OF TIME
= OR =
STORAGE
40.000
20.000
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 124

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS

TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 100 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142

21YR RICHMOND-47767

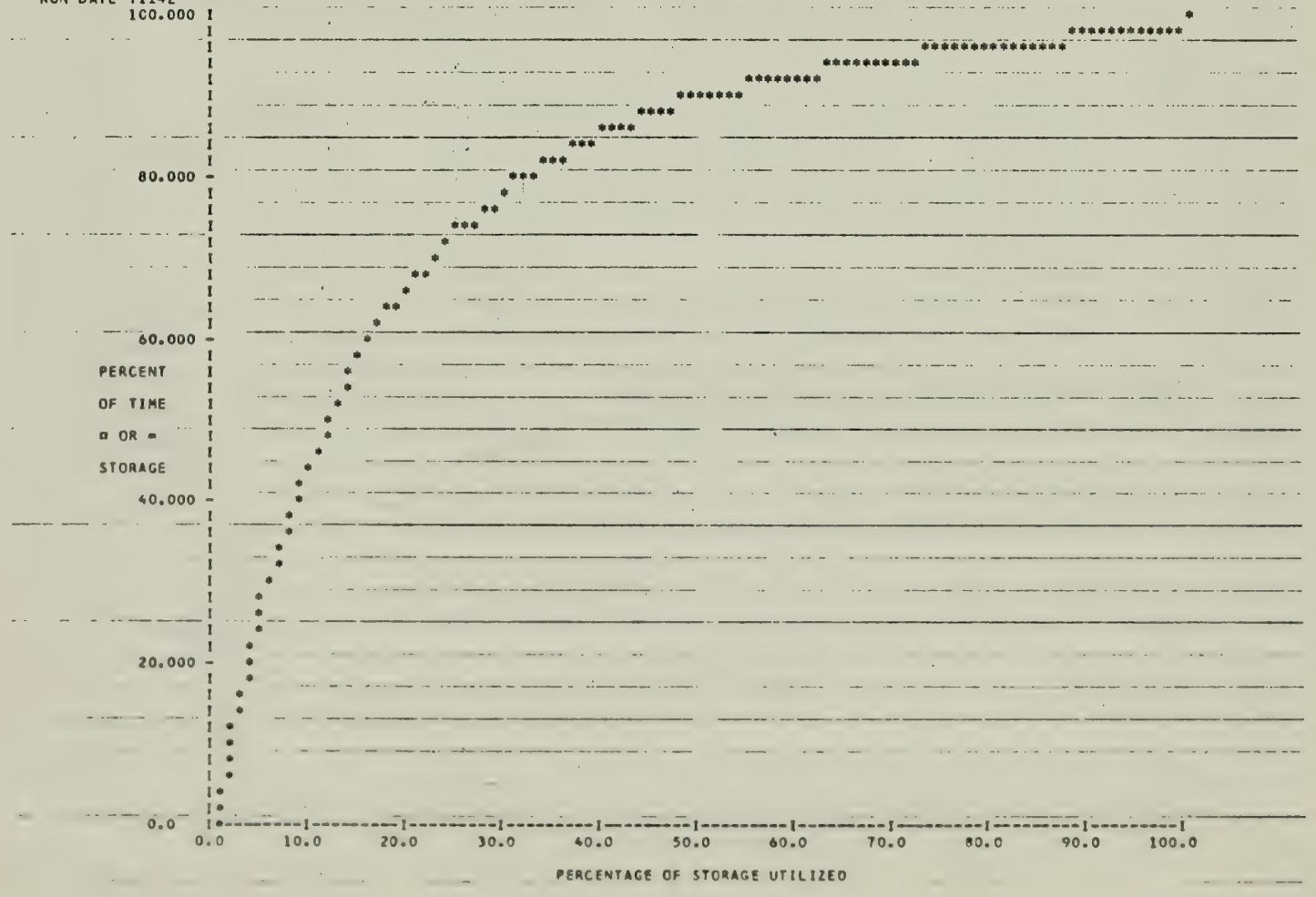


PLATE 125

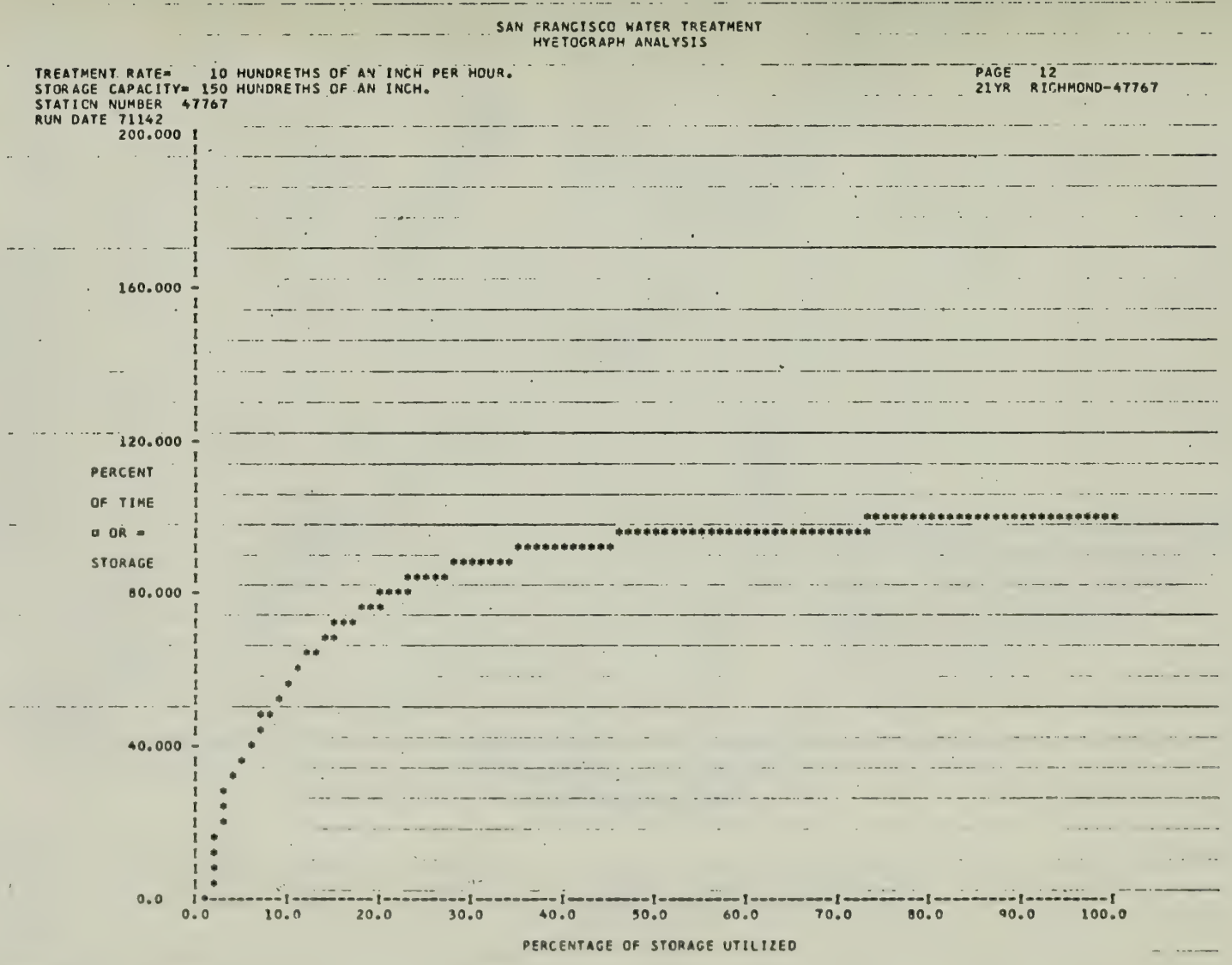
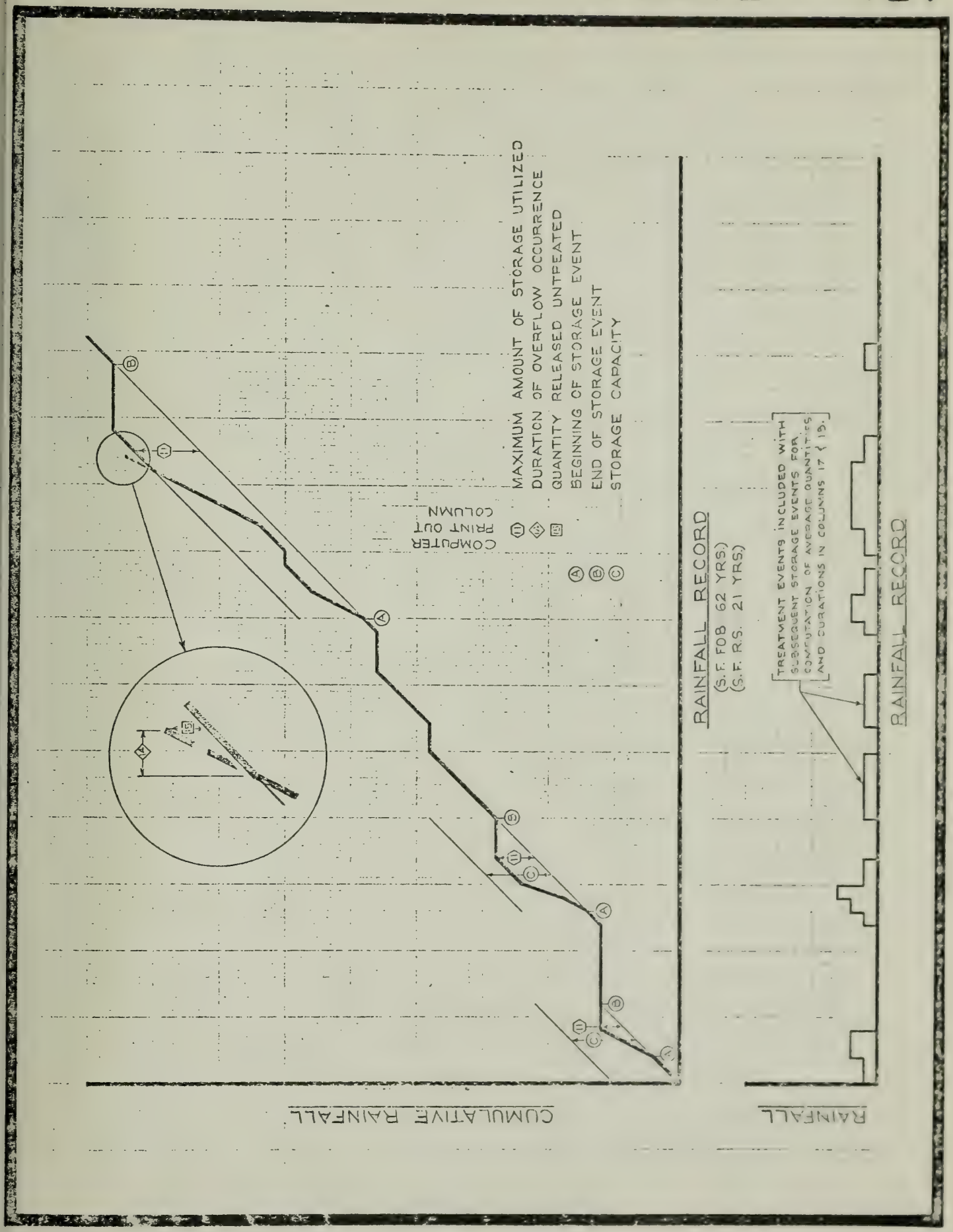

SAN FRANCISCO WATER TREATMENT
HYETOGRAPH ANALYSIS
TREATMENT RATE= 10 HUNDRETHS OF AN INCH PER HOUR.
STORAGE CAPACITY= 150 HUNDRETHS OF AN INCH.
STATION NUMBER 47767
RUN DATE 71142
PAGE 12
21YR RICHMOND-47767
200.000
160.000
120.000
80.000
40.000
0.0
PERCENT
OF TIME
= OR =
STORAGE
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENTAGE OF STORAGE UTILIZED

PLATE 126

PLATE 127


MAXIMUM AMOUNT OF STORAGE UTILIZED
DURATION OF OVERFLOW OCCURRENCE
QUANTITY RELEASED UNTREATED
BEGINNING OF STORAGE EVENT
END OF STORAGE EVENT
STORAGE CAPACITY
COMPUTER PRINT OUT COLUMN
RAINFALL RECORD
(S.F. FOB 62 YRS.)
(S.F. R.S. 21 YRS)
TREATMENT EVENTS INCLUDED WITH SUBSEQUENT STORAGE EVENTS FOR COMPUTATION OF AVERAGE QUANTITIES AND DURATIONS IN COLUMNS 17 & 18.
RAINFALL RECORD
CUMULATIVE RAINFALL
RAINFALL